IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JULY 20, 1961

★ UAW Meets Chrysler While Industry Ponders—

Will Autoworkers Strike For Job Security? p. 61

How to Win Worker Loyalty p. 71

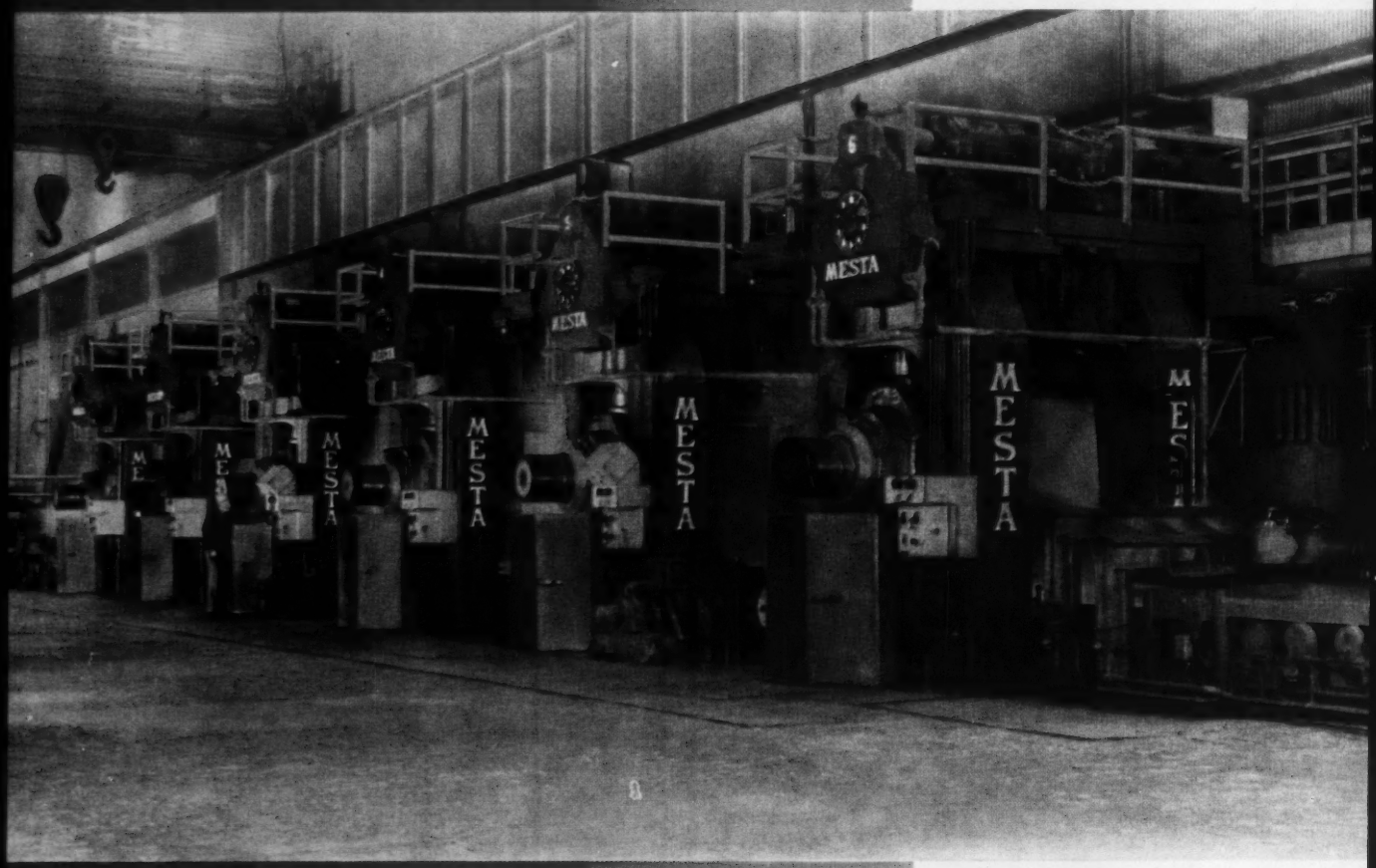
Why Bearings Fail p. 89

Digest of the Week p. 2-3

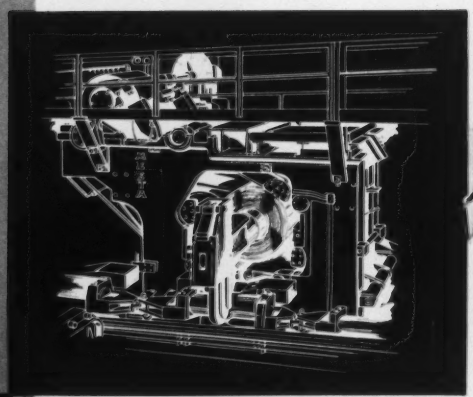
HOT STRIP MILLS

DESIGNED AND BUILT BY

MESTA



Six Finishing Stands with Three Vertical Edgers on the MESTA 44" Four-High Hot Strip Mill at Jones & Laughlin Steel Corporation, Aliquippa Works

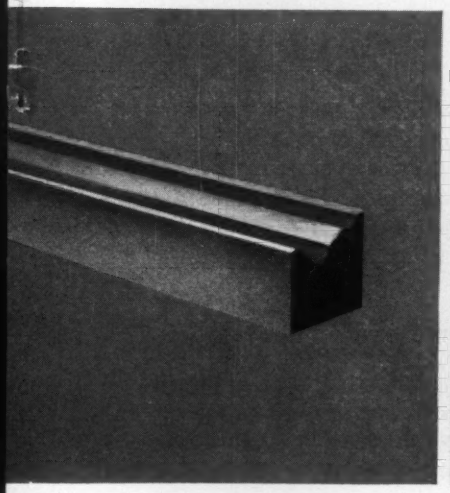


Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

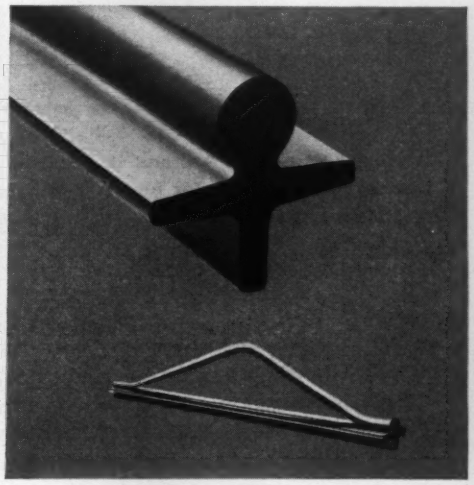
PITTSBURGH, PENNSYLVANIA

How to cut costs to make a better product



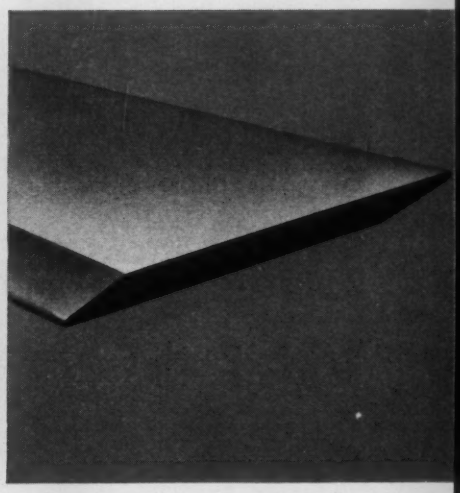
Costly machining eliminated

Manufacturer used to machine square stock to produce typewriter carriage rails. By changing to this special steel section, accurately hot-rolled and then cold-drawn to precise dimensions, he eliminated much costly machining, avoided scrap loss. Production rate was increased considerably.



For greater strength and durability

This custom-rolled section makes possible the economical fabrication of a railroad brake beam. Our customer first separates most of the "round" section from the "tee" by splitting the web between them to points near each end of the bar. He then compresses the "tee" portion of the bar, reducing its length and forcing the "round" outward to form a unitized truss. He reports this one-piece beam gives more reliable service, and is stronger than beams made by welding, bolting, or casting.



Faster production . . . using less steel

Our customer produced grader blades by flamecutting square-edge plate. By substituting this double-bevel special section, he eliminated the cutting operation, improving both his production rate and the appearance of his product. Because less steel is needed, the section costs less per foot, and shipping costs are reduced.

DESIGN WITH SPECIAL BAR SECTIONS, HOT-ROLLED TO YOUR SPECIFICATIONS

When you use special sections you buy less steel. You generate less scrap. Shipping and handling costs go down. Special sections reduce machining and fabricating operations and cut production costs. Special sections provide more freedom of design, and a stronger, more durable product—a product that has more sales appeal.

Could you use special bar sections, hot-rolled to your own product specifications? We'd be happy to discuss the possibilities with you . . . just call or write the Bethlehem sales office nearest you.

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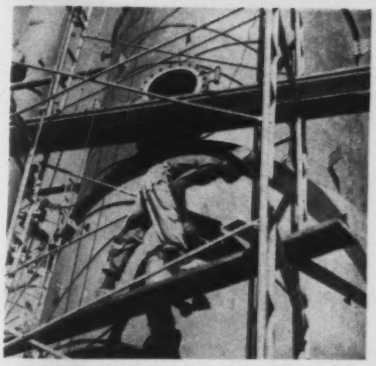
Special This Week

Auto Talks: Strike for Security?

The auto industry and the UAW have begun this year's most important contract negotiations. At issue is worker "security." It could be as far reaching as the improvement factor and SUB.

p. 61

ON THE COVER (left to right): Gervid Atkinson, manager-labor relations, and W. M. O'Brien, director-industrial relations, Chrysler Corp.; Norman Matthews, vice president, and W. P. Reuther, president, United Auto Workers; and J. D. Leary, vice president, personnel, Chrysler.

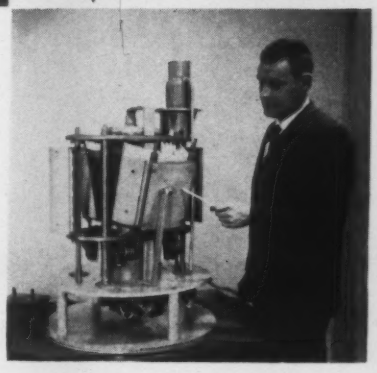


Plant Buildup Abroad: U.S. Cashes In

Industrial construction abroad is boosting exports of U.S.-made capital equipment. Between 1955-60, 17 companies recorded $2.4 billion in industrial foreign building. About $1 billion of this returned to the U.S. in orders for tools and materials. p. 64

How to Avoid Bearing Failures

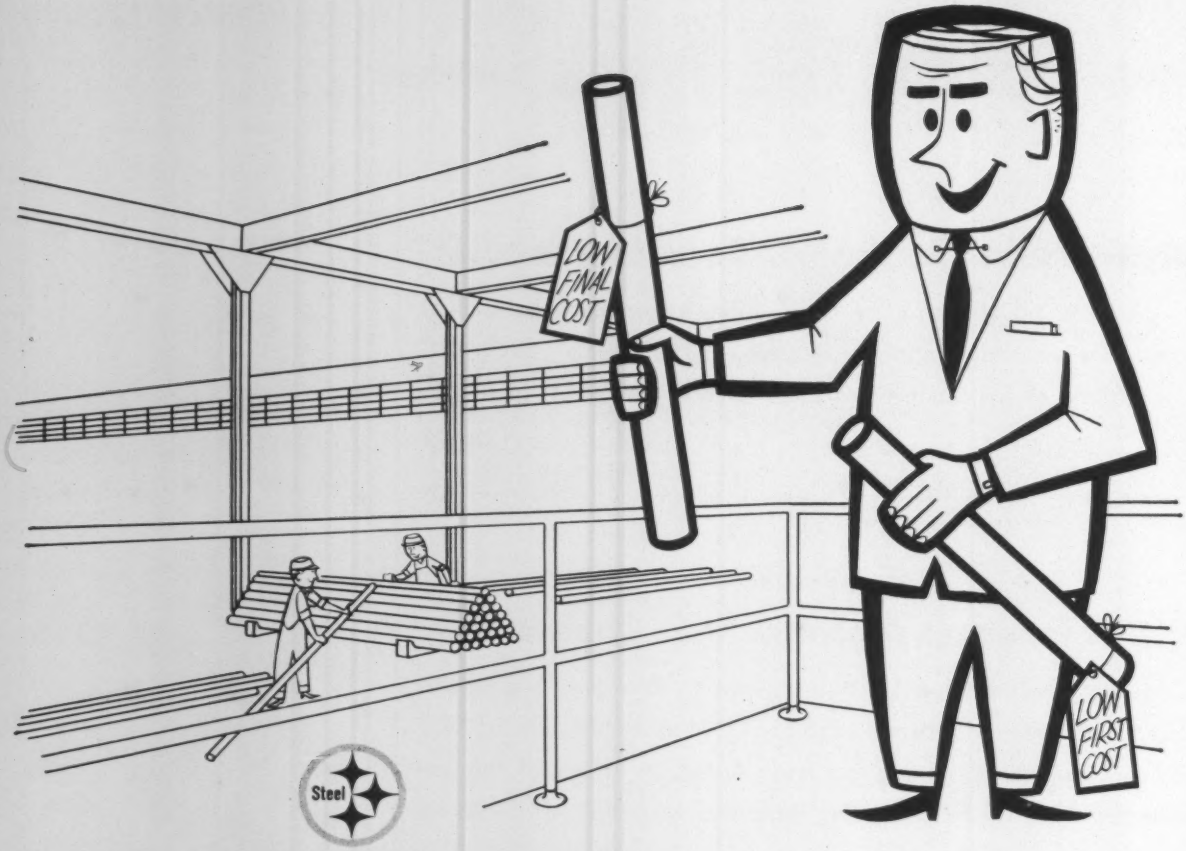
There are nine reasons why ball and roller bearings fail prematurely. Eight of these reasons center on abuse. By avoiding these common pitfalls, you can extend bearing life. Longer bearing life keeps machinery humming as maintenance costs tumble. p. 89



Next Week

Power for the Nation's Future

Next week's special feature is the second in a series on Metalworking's Technological Explosion. This full-color report will cover Future Power Systems. Most scientists agree: "What combustion has been in the past, plasma will be in the future."



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Get the final cost benefits of B&W Job-Matched Tubing

The lowest priced tube isn't necessarily the most economical tube. Initial savings can disappear with the first fouled-up delivery. Or, when production finds the tube lacks the necessary quality and reject rate climbs.

For real tube savings, consider B&W's full line of Job-Matched Tubing. Availability of all types, steel grades and sizes enables you to obtain an unbiased quote on the tubing best suited to your application. And delivery is prompt because of coordinated production and distribution facilities. For added value, B&W builds in uniform dimension, metallurgical properties, and tube quality beyond basic "spec" requirements. Tubes are matched to production equipment and application. The result: tubing that permits higher rate of output at lower unit cost.

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Are We Ready? Yes, the People Are!

None of us knows for sure what we can stand until we face it. Because life isn't always a bowl of cherries, there is much we refuse to face—until it meets us.

Just talking about it isn't enough. The old-time example proves: A child will pay no heed to warnings about a hot stove until he burns his hand. We are like that in many ways.

Because of this we get a bad name. There is unfounded talk that we are soft, that we are unwise to what is brewing, that Nikita Khrushchev will bury us—because we won't listen.

This is hardly the truth. Of course, it can be said that it will be too late when we do find out for sure—if we should fail to face up to the brutal truth of the Berlin crisis.

Yet a nation which got through one revolution, a civil war, two world wars, and a Korean War can't breed quitters. Nor can a nation which survived a great number of economic crises soften up to the extent that it does not know what individual liberty is.

You could cite juvenile delinquency, socialistic tendencies, centralized government, national profligacy, and a host of "proofs" that we are soft and weak. But they will not prove what we are capable of doing if our lives and our nation are threatened with extinction.

We have been spared much that other nations have not been spared. But that in itself proves nothing when it comes to our final readiness to face Communistic attempts to bury us.

The oldsters will not settle for tyranny in lieu of suffering or elimination.

The middle-aged will not sell their freedom for a failure to face up to facts.

The young will not be deterred from fighting for their future as they see it and live for it.

So who is soft? Who will not be ready? We all well know that to live under a tyranny that is Godless, that places the state ahead of the individual, and that desecrates all human traits of right, kindness, and value is worse than death.

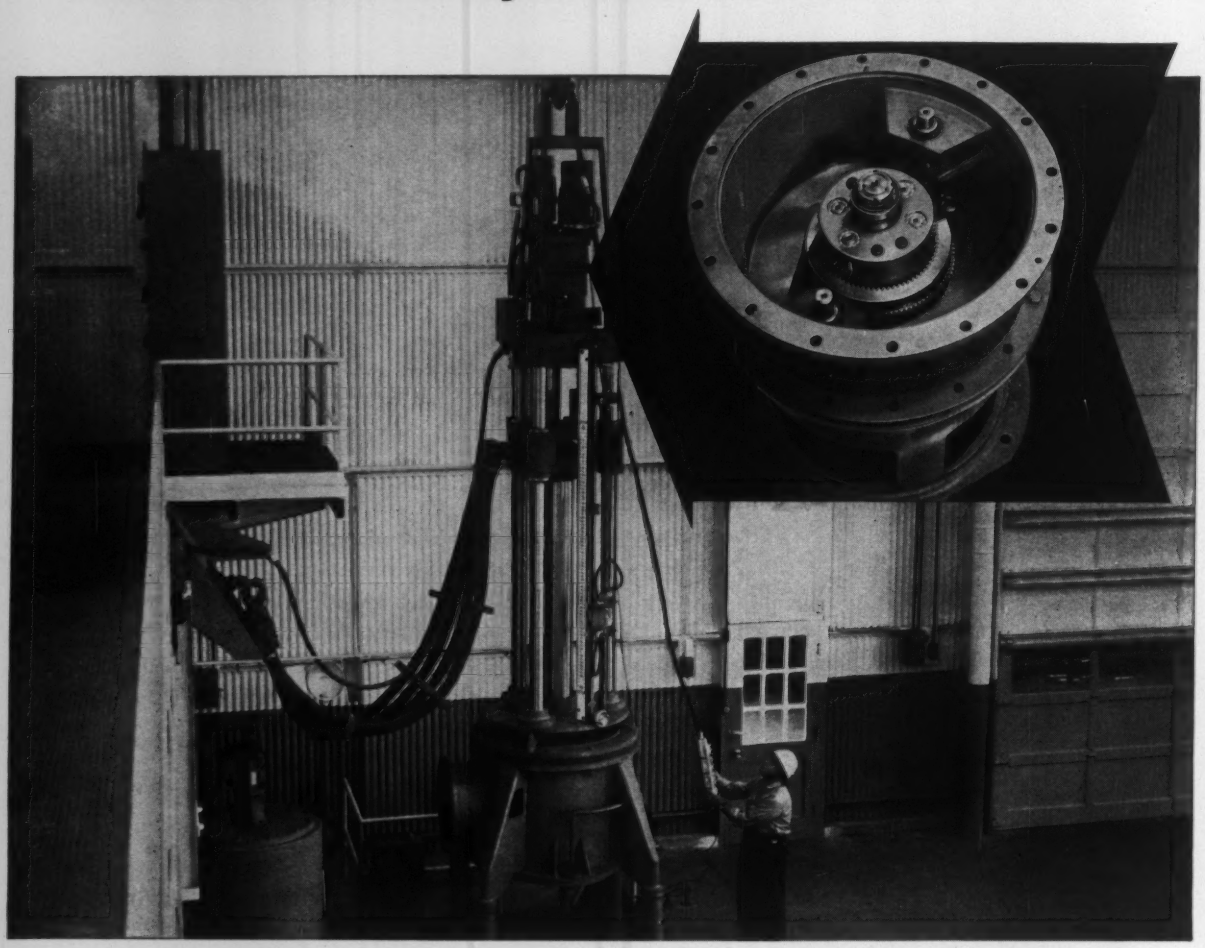
But why think that way at all? We have the means, the people, the guts, and the idealism. We will not lose. We may be threatened with catastrophe, but the time will never come when Americans will settle for a Munich.

The people are—and have been—ready.

Tom Campbell

Editor-in-Chief

Philadelphia Precision Ground Gearing Increases Sensitivity of New Vacuum Arc Furnace



Philadelphia precision ground gearing is responsible for smoother, more efficient operation of a new consumable electrode vacuum arc melting furnace installed at Standard Steel Works Division of Baldwin-Lima-Hamilton Corporation.

This specially designed differential reduction, planetary gear drive greatly increased the efficiency of the furnace. The old problem of stop-start action with uneven electrode burnoff has been completely eliminated. Now, uniform electrode feed permits arc voltage to be maintained within $\pm .1$ Volt. Electrode burnoff is uniform.

This drive problem is typical of hundreds that have been solved with Philadelphia hardened, precision ground gearing . . . problems where improved gear accuracies have resulted in space and weight savings, higher-speed operation, reduced sound and vibration levels, and longer gear life—all at no increase in cost.

Our experienced engineering staff, specialists in all types of power transmission problems, make sure that proper design and materials combine to meet your most exacting needs.

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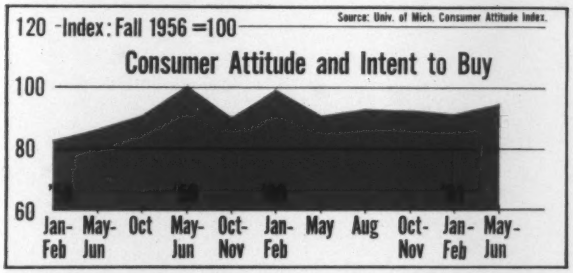
Consumers Ready To Buy, But . . .

Consumer attitudes point to more buying in the next six months compared to the same period last year. The latest quarterly report of the U. of Michigan Survey Research Center places their index at 95.0, up from 91.7 a year ago.

Consumers are cheered by business trends but concerned over "substantial" unemployment.

Nearly half of those interviewed by the Center from mid-May to mid-June felt it was a "good time to buy" cars, houses, and large household goods. But plans to buy major appliances remain low.

Sums up the Center analysts: "Increasing consumer purchases will hardly pave the way for a vigorous



and enduring upturn, unless concern about unemployment can be dissipated."

How "Excess" Is Capacity?

The so-called plague of "excess capacity" is getting a second look from a lot of people these days.

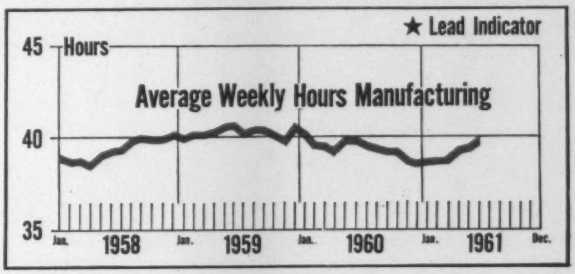
As more capacity is put into use in the recovery, then more in management become nervous. Big reason: Actual capacity is not a precise thing at all in most cases. Says the National Industrial Conference Board in a new study: "All too frequently capacity measurements are subjective estimates and judgments."

First to sense capacity "nervousness" are makers of production equipment. One equipment company president claims that during the recession many companies scrapped idle facilities. There is a reluctance by industry heads to talk about these moves.

Workweek Now Over 40-Hours

The factory workweek in June, for the first time since May of last year, went over 40 hours. Factory workers averaged 40.1 hours on the job in June. This is seasonally adjusted data. And it is a gain over the 39.7 hours worked per week in May.

The rise in workweek to over 40 hours carries special weight at this point. It indicates that many industries are paying overtime costs. And with factory earnings ($94.20 per week) at an all-time high, it



means that companies will soon cease adding overtime hours and start adding new employees.

Internal Funds Rate Fresh Look

Corporate internal funds are watched carefully by capital goods producers. This is because most capital spending arises from these funds.

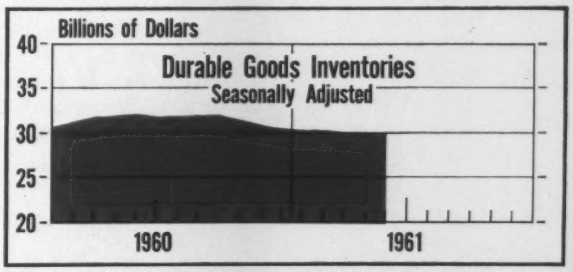
Latest to take a fresh look is the Machinery and Allied Products Institute. It finds a striking shift in the make-up of these funds since World War II. Finding: Retained earnings make up only about 25 pct of all internal funds, from a 1948 high of 60 pct.

This shows why depreciation and amortization and depletion funds rate increasing attention.

Durable Goods Stocks Level Off

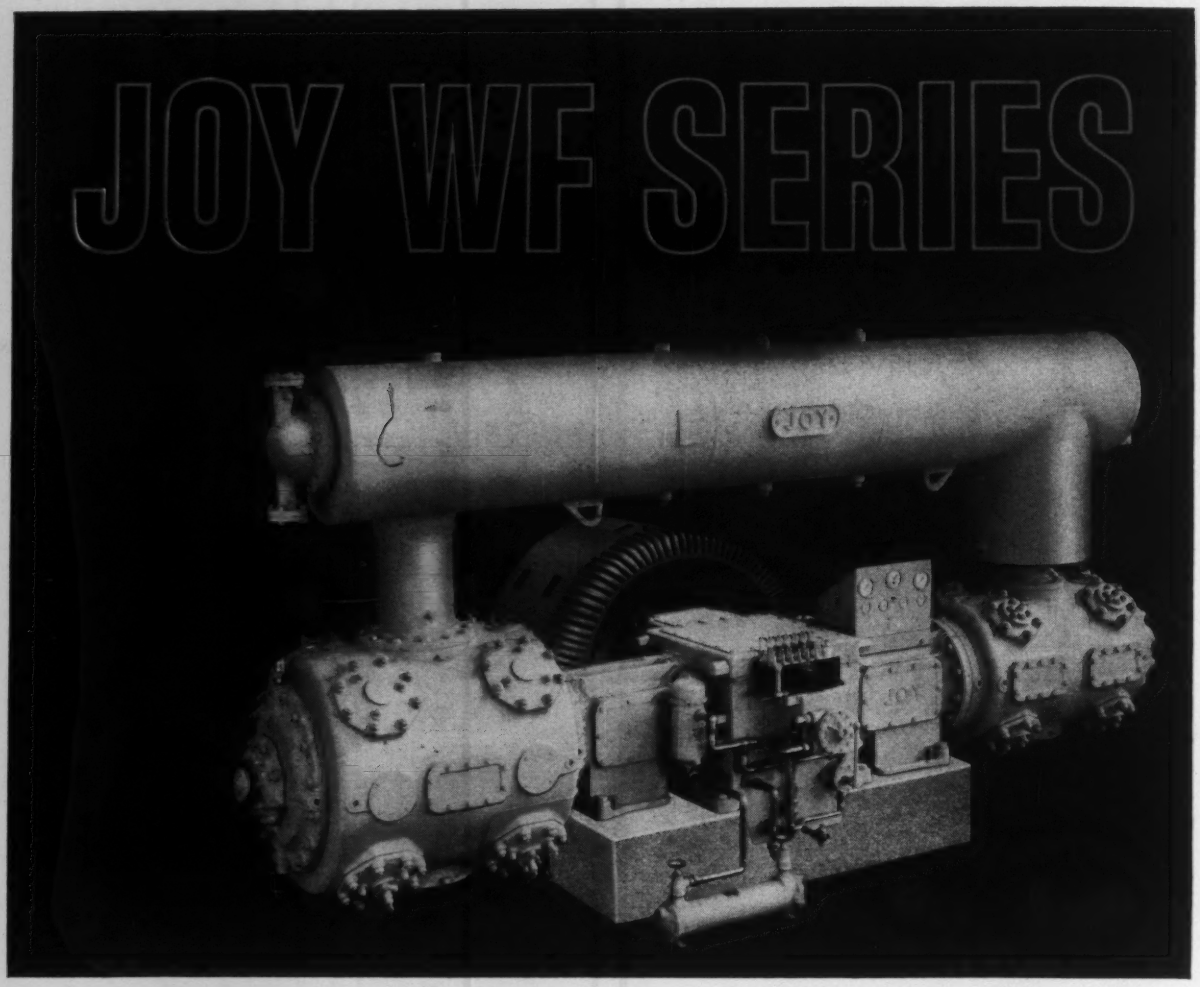
Durable goods makers halted stock liquidation in May. But there are no signs yet of stock accumulation. Inventories, seasonally adjusted, totaled $30.17 billion in May, a relatively small $10 million over April.

While the rise in May in value of stocks held by durable goods makers was slight, it is notable that a trend of nine months was halted.



But a new trend to stock accumulation is not yet signaled, unless strike-scare buying takes hold. Inventory buildup probably won't start until August at the earliest. Later, if price softness lingers.

JOY WF SERIES



Announcing A Series of Horizontal Opposed Compressors in the 300-2000 HP Range

Designed for the great bulk of industrial air and gas applications, the WF series is the result of Joy's experience with over two and one half million compressor horsepower in the field. Every component is designed for dependability and ease of maintenance.

Installation and maintenance costs of the WF series are held to a minimum due to superior design. Since the motor rotor is mounted directly on the compressor shaft, alignment problems are minimized, installation is simplified, and less floor space is necessary.

The WF-102 air compressor pictured above has a displacement of 1972 CFM, and is driven by a 300 HP motor when discharging at pressures up to 125 PSIG. Larger models of Joy horizontal opposed compressors are also available as well as vertical, V-vertical, and turbodynamic machines. For additional information on the WF series write for Bulletin 3369-48.

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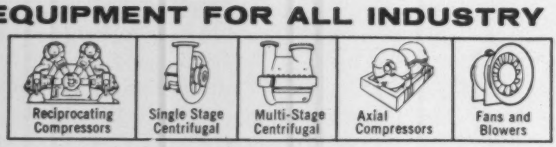
AIR MOVING EQUIPMENT FOR ALL INDUSTRY



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Wages, Price Policies Under Study

White House preoccupation with wage and price policies shows up again in plans for a study of wages and prices by President Kennedy's labor-management council.

The study of "sound wages and price policies" was called for after

TAYLOR: Heads study.

a six-hour White House discussion last week. Views on what are "sound" wage and price policies were as varied as the private interests of the 21-man council.

A subcommittee headed by Dr. George W. Taylor, labor relations professor at the University of Pennsylvania, will make the study. Its findings will go to President Kennedy in the fall.

Once again, it should be noted, wage and price studies are supposed to be ready in the fall—the time a price increase in steel is expected. Though the study is not supposed to focus on any single industry, there is no doubt the steel industry is on everybody's mind.

Business Opposes NLRB Revision

Business men are attacking President Kennedy's plan to reorganize the National Labor Relations Board. They claim the President's plan would give a few men unlimited power over labor-management relations.

The President's plan, which would permit trial examiners to decide on complaints of unfair labor practice without review, will go into effect Sunday unless either the House or the Senate votes it down.

Opposition to the plan has come from the U. S. Chamber of Commerce and the National Assn. of Manufacturers. NAM spokesmen said revamping of the NLRB would shake public confidence in the agency because decisions would be made by employees far removed from the voters.

UAW: Studies More Plant Transfers

The UAW is moving quickly to follow up its court victory giving transfer rights to workers at a plant moving to the South.

The union says it is studying several other cases where plants are being moved to the South. And it indicates it may take legal action to nail down transfer rights of workers.

In at least one case, a court test would raise a new issue: Do workers have transfer rights when the work is moved to an existing plant in another state?

The recent case dealt with a move to a new plant in a different state.

JFK Asks Strike Powers

President Kennedy plans to try for a tighter grip over labor-management disputes than allowed by the Taft-Hartley law. But Congress is in no mood for new Federal controls leaning closely to compulsory arbitration.

The President's proposals are now being prepared for Congress. They would:

Give the President power to put key industries under government management to stop a crippling strike.

Make government labor dispute inquiry boards more than just fact-finding groups by giving them power to recommend settlement terms.

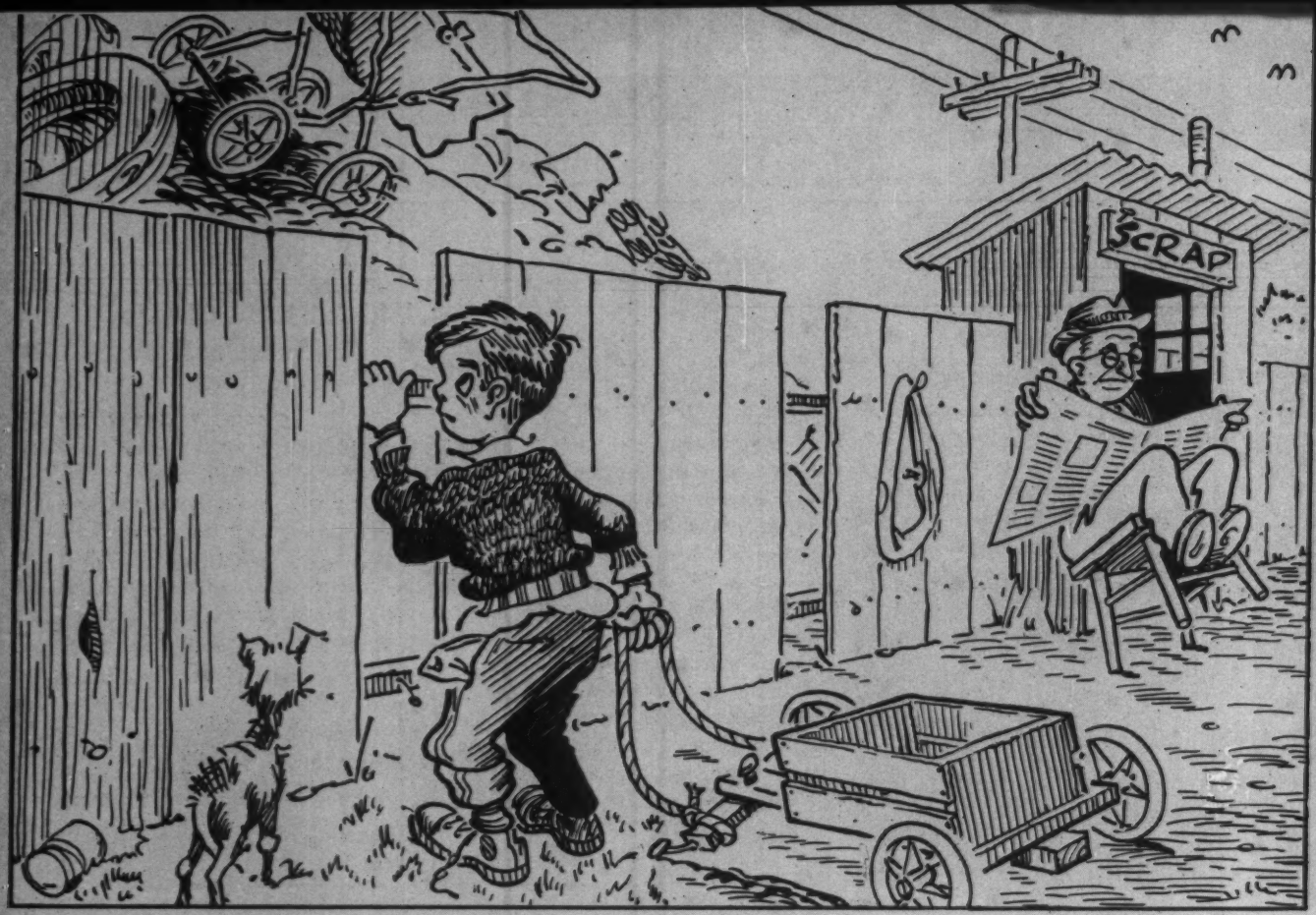
Give the President power to force strikers back to work without having to go to court, as is presently required.

It is believed these new powers would be used only sparingly if they became law. But the danger of abuse definitely exists.

What the President wants from these laws is a weapon for control through moral suasion. The President believes he can force labor and management into agreement without actually using these powers. It might be termed "control by threat."

Though these proposals are short of compulsory arbitration, they will be almost as controversial. Congress will be hesitant to give the Chief Executive such powers. But the President has just begun. If he doesn't get them now, he will keep trying.

Of course, labor and management are not going to take it sitting down. Lobbying activities will be conducted at a fever pitch. The result of the battle could change the whole pattern of labor disputes.



REMEMBER WHEN...

You Couldn't Afford Scrap?

You still can't! As a manufacturer, one of the primary problems you face today is probably the reduction of scrap. Many manufacturers are using *American* machine tools to lick the scrap problem.

Take the United States Beryllium Corporation, for example...

To produce 9" diameter memory drums for computers from the light but strong space-age metal, beryllium, requires extreme precision. Specifications for these drums called for lathes which would hold flatness, roundness, squareness and size to .0001" or less. Because the raw material is extremely expensive, scrap would be disastrous. Anything less than the best lathe could not be considered.

That's why the United States Beryllium Corporation plant at Inglewood, California chose American Lathes. According to Mr. Frank Hevrdejs, Vice President of U. S. Beryllium, their Americans are turning perfectly round within .000050" to help produce these beryllium memory drums with an absolute minimum of scrap.

"Impossible" jobs are routine for American Lathes. Thanks to their carefully engineered rugged design, they keep on performing their accurate jobs year after year in tool room, maintenance and production applications.

If you have a scrap problem, contact your American distributor. Learn how you can secure American Lathes and American Radial Drills on "Toolease," our popular leasing plan. Or, write Section 164 at the address below. Ask for bulletins 116 and 801.

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★Unified Tool Buying Studied

The Defense Dept. is revising its machine tool purchasing policies. The changes began after auditors reported that bad management of idle machine tools was costing the government hundreds of thousands of dollars each year.

U. S. Comptroller General Joseph Campbell told Congress that a review of some purchases revealed new tools costing $700,000 were bought when identical or substitutable idle equipment was available.

These included boring, grinding, milling, and drilling machines. Despite a reserve of 140,000 military machine tools (20 pct of the Defense Dept. inventory), the auditors say $63 million was spent for new tools in the fiscal year ending last month.

Thomas D. Morris, Asst. Secretary of Defense for Installations and Logistics, says he believes the instances of unnecessary procurement were within reasonable limits. However, he admits that the procurement in question was "unnecessary."

He has ordered a study of Defense Dept. procurement of production equipment, giving special consideration to putting it under a single manager. The auditors feel a single manager for tool buying for the Army, Navy and Air Force would end unnecessary procurement.

Meanwhile, Mr. Morris says, immediate improvements will be made. These actions include: "Improved procedures for numbering and screening of non-industrial equipment; requirements for rescreening of delayed procurements; more effective management and control procedures by the production equipment redistribution group (which keeps track of idle machine tools); and further centralization in the management of all industrial and military-user production equipment owned by all the technical services of the Dept. of the Army."

■ Price-Fix Threats Turning Into Laws

Sen. Estes Kefauver's threats to lay the blame for price-fixing on top company executives have been turned into legislation. A bill to make top management responsible for collusion to fix prices is now before Congress.

The legislation would amend the antitrust law to:

1. Increase fines for violations of the Sherman and Clayton antitrust statutes. Fines for individuals would be increased from $50,000 to $100,000, and for corporations up to $500,000.

2. Punish top corporate officials who knew about, but took no action to stop, price fixing by subordinates.

3. Impose mandatory jail sentences for business executives convicted of the same criminal price-fixing offense within 10 years of the first conviction.

4. Require competitive bidders for government contracts to certify that any identical bids were not the result of collusion.

■ Commerce Sets Up New Advisory Group

Commerce Dept. will set up a new Business Advisory Council to replace the elite group which broke its ties with the government.

In a surprise move, Commerce officials decided to replace the old BAC, which has become the Independent Business Council, with an advisory group tied to the Dept.

What this means to the independent council's offer to advise government can only be guessed. Apparently, it will render the old group ineffective as far as government is concerned.

Commerce officials say they are in no hurry to set up the new council, because there now are no pressing problems which require advice.

■ Hearings May Aid Small Metals Makers

The administration is trying to evolve an equitable policy for subsidization of all small metals producers.

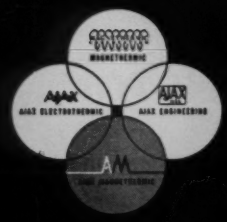
The move to find a system of subsidies or tariffs to aid these producers is being brought to a head by the controversy over legislation to aid the ailing lead and zinc industry.

The administration is being prodded by mining state Congressmen to speak out on metal producer proposals now before Congress. It may state its policy at new hearings on a lead-zinc subsidy bill to be held next Tuesday by a Senate interior subcommittee.

■ $1 Billion More For Arms Sighted

A Defense Dept. review of military spending, which may hike President Kennedy's armament requests by $1 billion or more, is due out this week.

The review was ordered by the President to determine what defense steps should be taken to counter Russia's huge arms buildup, and to be prepared for a new Berlin crisis.



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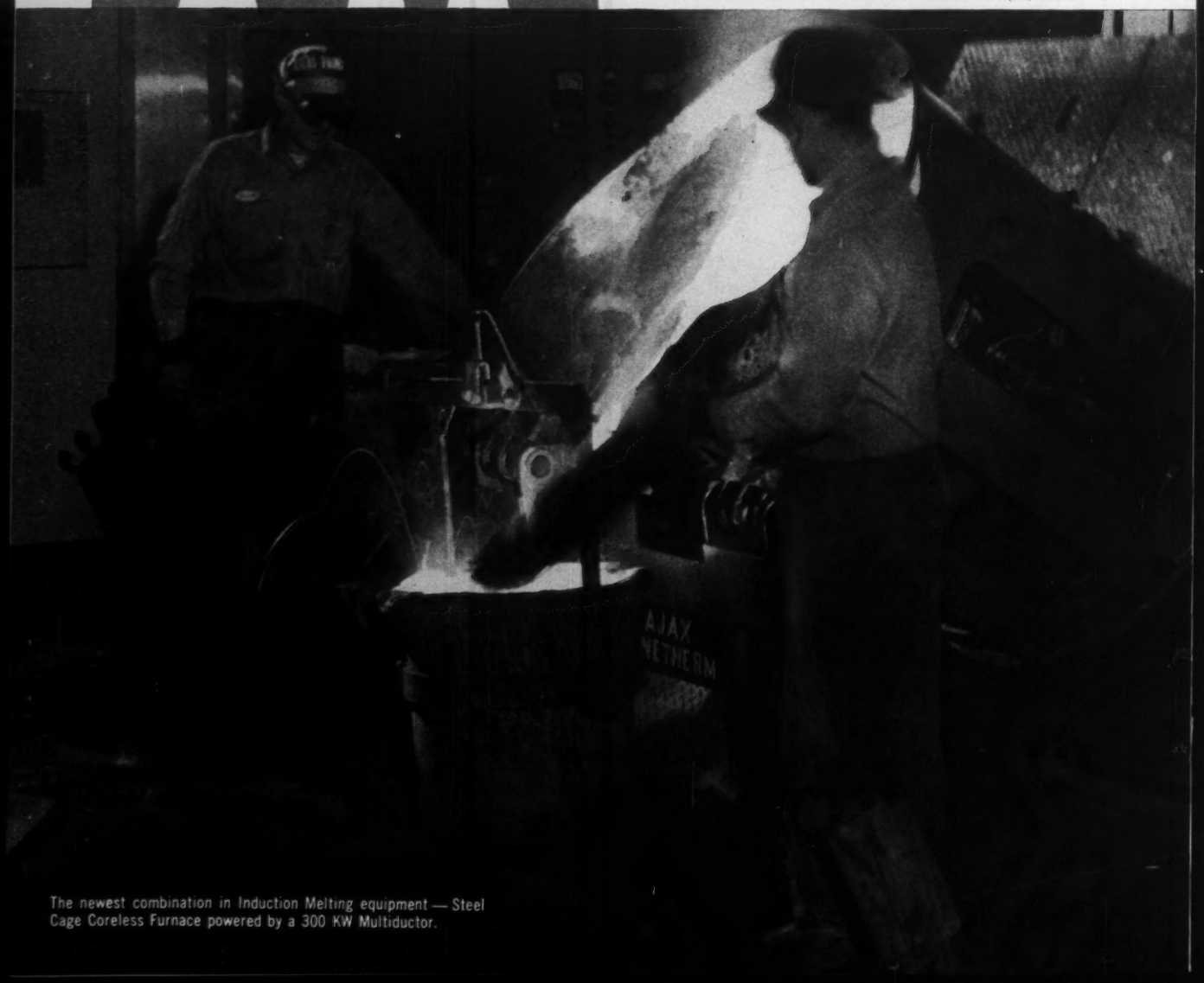


The newest combination in Induction Melting equipment — Steel Cage Coreless Furnace powered by a 300 KW Multiductor.

Kennedy's Tariff Power Is Threatened

A Congressional move is under way to take away the President's power to make final decisions on U. S. tariff proposals.

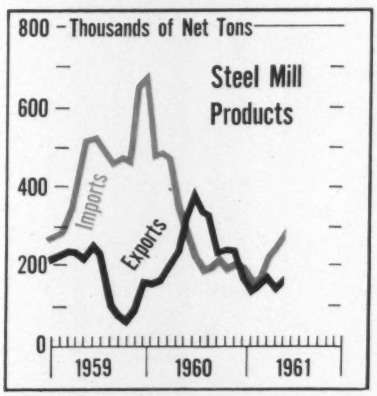
Sen. Styles Bridges (R., N. H.) wants to make U. S. tariff Commission proposals final. The President can now reject or accept them as he sees fit.

Senator Bridges has introduced legislation to make the Commission's recommendations mandatory. His bill would also set up for U. S. businessmen and other "interested parties" more avenues to escape injury from foreign imports.

The Commission sent President Kennedy three escape clause cases in May. He has 60 days to render a decision. These cases are significant because they afford the first clear-cut indication of what the Administration proposes to do on domestic claims of injury from low-wage competitive imports which have been upheld by the Commission.

Steel Exports, Imports Gain

Both exports and imports of steel mill products rose in May. But overseas sales of steel products still lag behind those of last year.



In the first five months of this year, a total of 744,000 tons were exported. That's well below the one million tons sold abroad in the same period of 1960. This lag is actually part of the longer term decline that started in 1957. It resulted from reduced demand for some products, the growth of foreign steel production, and increased price competition from Western Europe and Japan.

Exports of steel mill products in May totaled 159,000 tons. That's a gain of 21,000 tons over April. Steel pipe and tubing, structural shapes, and sheets and strip accounted for most of the gain.

Imports climbed to 266,000 tons —a gain of 31,000 tons over April. Wire rods, round wire, concrete reinforcing bars, and sheet and strip were the key import items.

New Common Market

The General Treaty of Central American Economic Integration is now in effect for Central American countries.

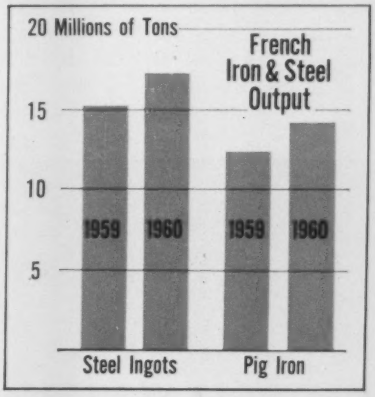
Under the terms of the agreement, Guatemala, El Salvador, and Nicaragua will pull together to form a common market within five years (IA—March 16, p. 13). The Constitutive Agreement of the Central American Bank of Economic Integration, and the Second Protocol to the Central American Agreement on Equalization of Import Charges are also in effect.

French Steel Production Climbs

Iron and steel production in France hit a record level last year. And production goals for the next few years call for even bigger strides.

Crude steel capacity in France rose from 1959's level of 16.2 million metric tons to 18 million tons last year. Pig iron output increased 13.4 pct over 1959 to 14.1 million tons. Steel ingot production in 1960 totaled 17.3 million tons compared with 15.2 million tons in 1959.

Behind all of this was an 8.5 pct gain in orders from domestic consumers in France. Activity with engineering industries rose 10 pct over 1959.



Another important factor in the growth of steel production is the rising demand of the French auto industry. Truck production, for example, climbed 25 pct in 1960.

Steel production goals for 1965 now stand at 24 million tons.

Eximbank Funds

President Kennedy has amended his budget request for the Export-Import Bank to finance a comprehensive export credit guaranty program.

The President requested the limitation of $2.75 million on administrative expenses be increased to $3.01 million. White House spokesmen say the increase request reflects additional expenses needed to put the Eximbank program on the level of those provided foreign exporters in many European countries.

Have you analyzed your weighing operations lately? Weighing of raw materials, goods in process and finished products is big business. And while you've probably automated other areas, you may not realize what Fairbanks-Morse Electronics Weighing can do for you. ● Chances are your present weighing operation lends itself to the speed and efficiency of an F-M Electronic System. You will realize impressive savings in time, labor and material... money savings that can add substantially to your profits! ● Fairbanks, Morse knows the weighing business—we've been in it for 131 years! We've pioneered precision weighing instruments of all types, and we are the leaders in the ever-expanding field of electronic weighing. To meet the need for fast, modern weighing of any liquid or solid, Fairbanks, Morse offers a wide range of standard electronic weighing systems plus custom-designed installations. ● The F-M Batchetron, for example, electronically weighs and batches a number of liquids or solids—in sequence or simultaneously—by means of manual or punched card control. Other F-M Electronic systems quickly weigh trucks and railroad cars. In each of these cases you can readily see the obvious savings in time . . . and in money. ● If weighing plays an important part in your operation, you will profit from more information about F-M electronic weighing systems. Please write: **Electronics Division; Fairbanks, Morse & Co.; 100 Electra Lane; East Station, Yonkers, New York.**

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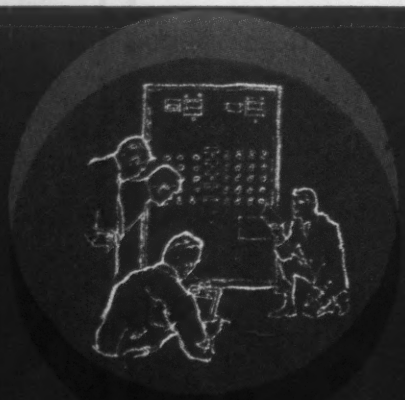
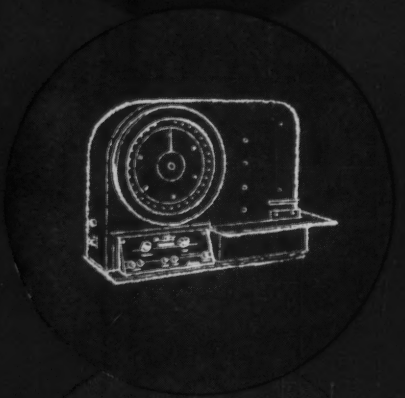
A MESSAGE TO MANAGEMENT FROM FAIRBANKS-MORSE ELECTRONICS DIVISION...





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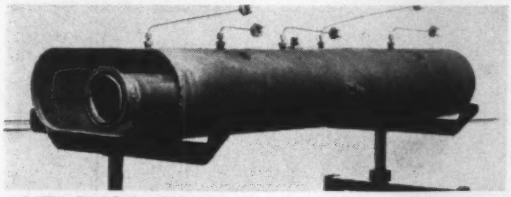
Maximum speed—maximum accuracy for weighing materials in motion. Equipped with read-out feature and built-in memory, to transmit weight records into the most modern computers, printing devices, tape and card punch machines.

NEW DIMENSIONS IN ELECTRONIC DEVICES

Aids Fight Against Smog

Anti-smog devices may soon be a reality. At least engineers at Allegheny Ludlum Co. think so. They've developed a new stainless steel for automobile mufflers. These mufflers are close, if not as hard-working, cousins of anti-smog



ANTI-SMOG UNIT: Faces tough environment

devices. Both of these units face the same overriding problems—corrosion and heat. Although the new stainless is relatively inexpensive it combats exhaust corrosion and heat effects.

High-Strength Ceramic

With a melting point of 5100°F, a new magnesium-oxide ceramic boasts a tensile strength of 45,000 psi. Conventional ceramics of this type have tensile strengths of only 24,000 psi. But that's not the whole story. Along with its high strength, the translucent newcomer offers unusual density. It comes within 2 pct of the optimum density for magnesium-oxide ceramics.

Boiling Metals Swap Heat

A study of heat transfer by boiling liquid metals is now underway. The University of Michigan is handling a 20-month program for the Air Force. Professors are looking at sodium, potassium, mercury, lithium, and rubidium. Object is to explore heat-transfer possibilities in nuclear reactors. These metals have low vapor pressures at high temperatures. Their use may lower structural requirements on reactor containers.

Anneals Reactive Strip

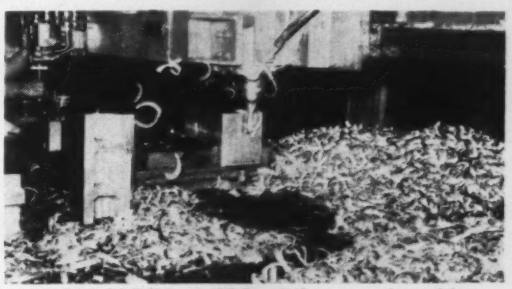
An electron-beam furnace yields strip-annealing speeds up to several thousand feet per minute. Initially, the new unit is earmarked for work on reactive metals. Quality results with tantalum, columbium, titanium and zirconium hinge on the furnace's high-vacuum chamber. Processing speed stems from the almost-instant heating provided by an enclosed electron gun.

Sniffs Leaking Gas

The human sense of smell detects certain odors in concentrations as low as 1ppm in air. But scientists have come up with an electronic "sniffer" that's even more sensitive, and much more accurate. It senses and exactly gages gas concentrations as low as 0.1 ppm. Unlike our sense mechanism, odor has nothing to do with its operation. The instrument is used primarily to detect leaking sulphur hexafluoride. This odorless gas acts as a high-voltage insulator.

End Mill Speeds Output

In a remarkable example of production milling, over 8 tons of chips were produced from 1500 aluminum blocks with just one end-milling machine. This heavyweight, built by The Weldon Tool Co., operated at 960 rpm, with an average feed rate of 8 ipm. At this speed, each 8-hr shift

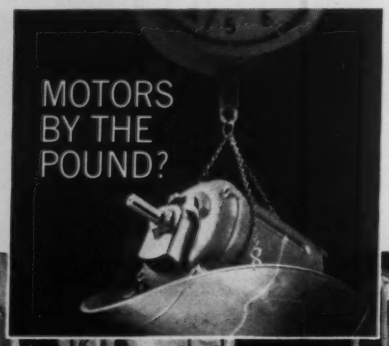


HIGH-SPEED MILL: Piles up the chips.

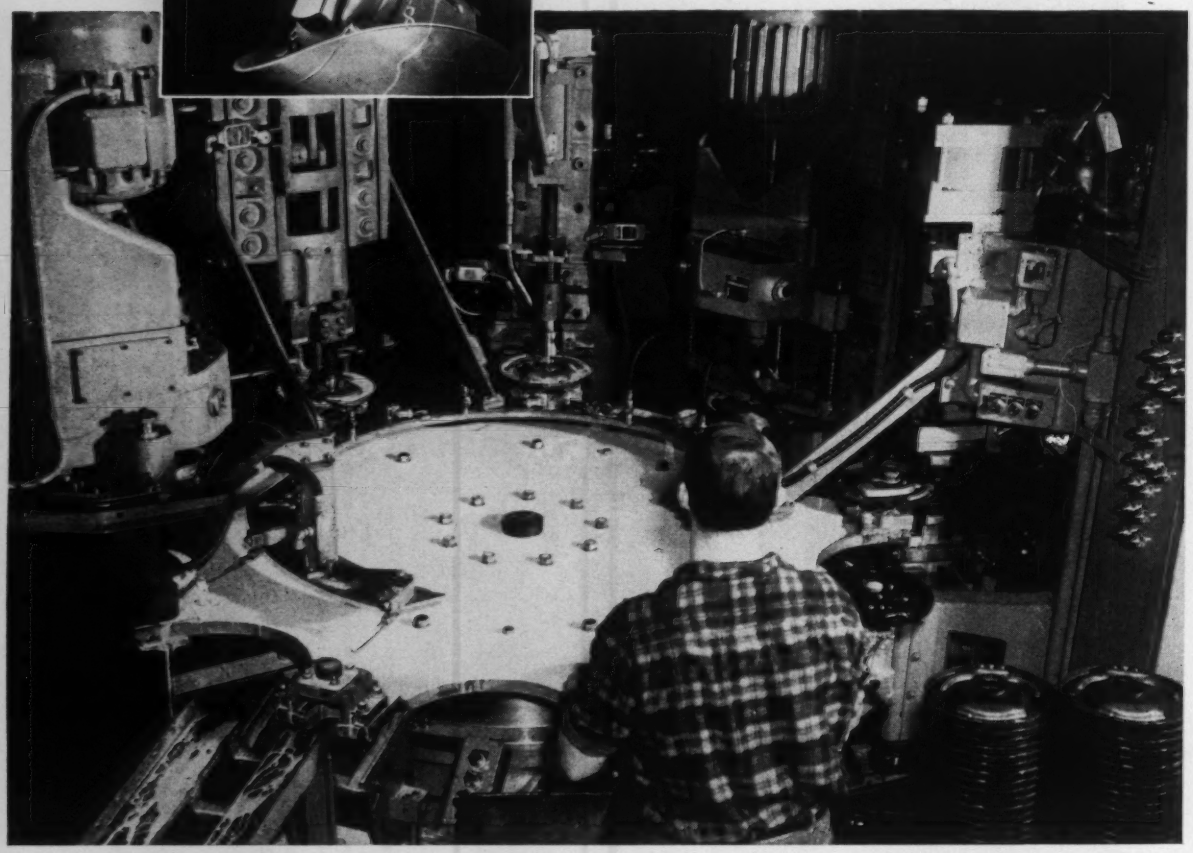
was able to turn out 50 blocks. About 12 lb of chips came from each block. Thus 600 lb of aluminum chips were milled per shift, and the whole job took just 240 hours operating time.

Vibration: Good or Bad?

Ultrasonic vibration can boost cutting-tool life by as much as 400 pct. Russian toolmakers report: "Low-intensity radial vibration increases tool life. But intensities above 10 microns may cause excessive wear and premature breakage."



You're buying motors by the pound when price is the only consideration



Today's machine tools can't afford motors selected on the basis of price alone

Modern machine tools are designed to manufacture products of great precision at the lowest possible cost. But a machine tool is only as productive as the electric motors that drive it. Motors purchased on the basis of price alone often fail to give their users the greatest value in terms of useful service life.

The selection of the right motor to power your products requires not only specification of type, rating and operating characteristics, but consideration of such factors as uniform, troublefree performance, dependable long-life operation, the reputation of the manufacturer, and his ability to provide immediate repair parts and service —when and where they're needed. Wagner® motors have earned their reputation for proven dependability in their specific applications.

Next time you buy motors, check beyond the purchase price. Make sure that you get all the performance you need—with motors that will do the job.

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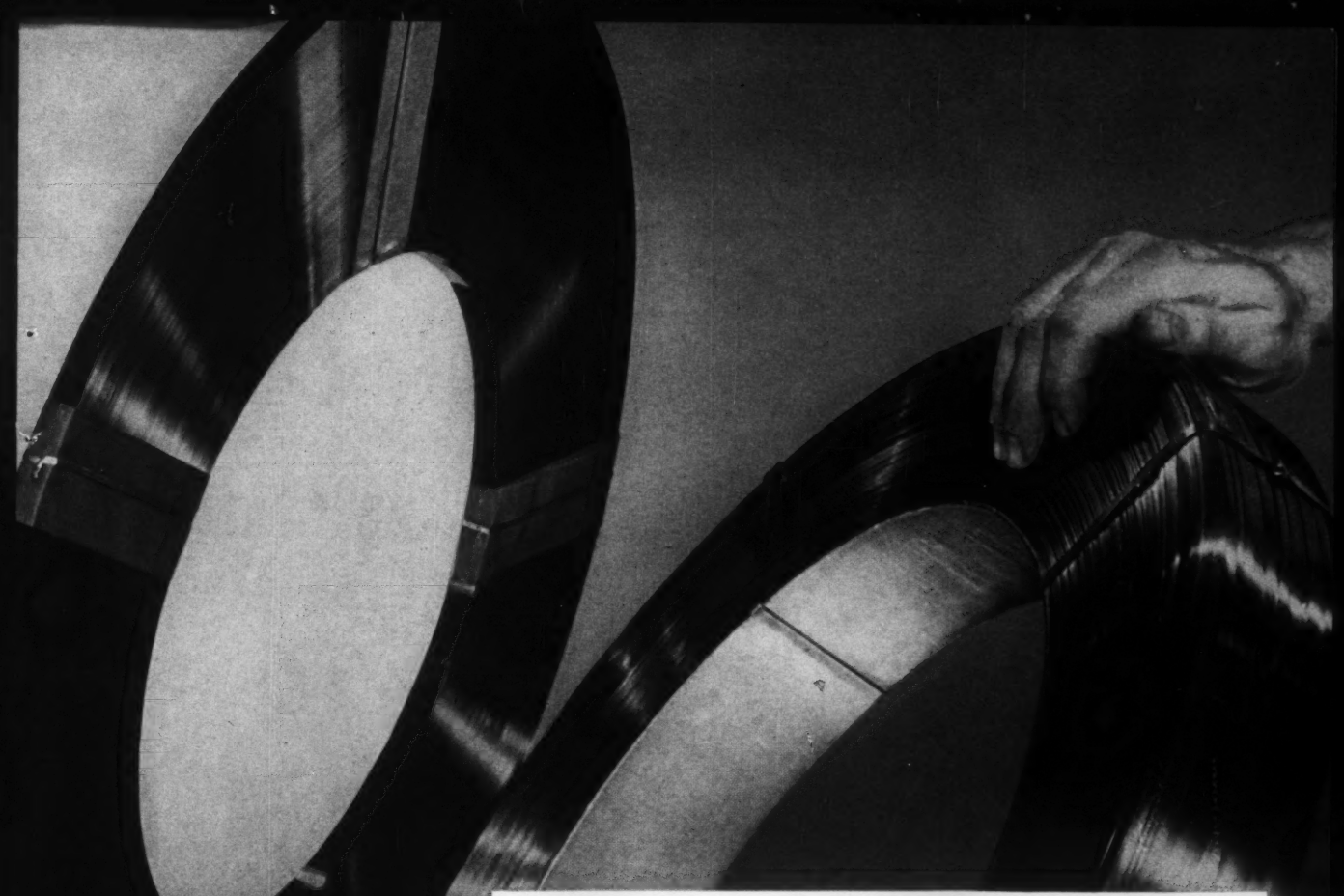

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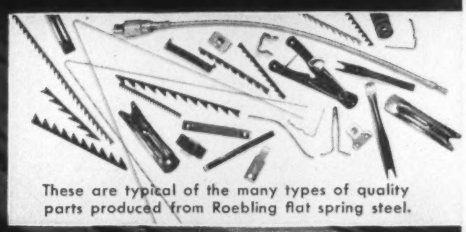
. . . *our* records show that when a manufacturer once discovers the exceptional and uniform quality of Roebling flat spring steel, he becomes a permanent Roebling customer.

Your records for faster production and lower costs can be improved, in large measure, by Roebling's strict attention to supplying you with the finest flat spring steel available. When you need flat spring steel, specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete details.



These are typical of the many types of quality parts produced from Roebling flat spring steel.

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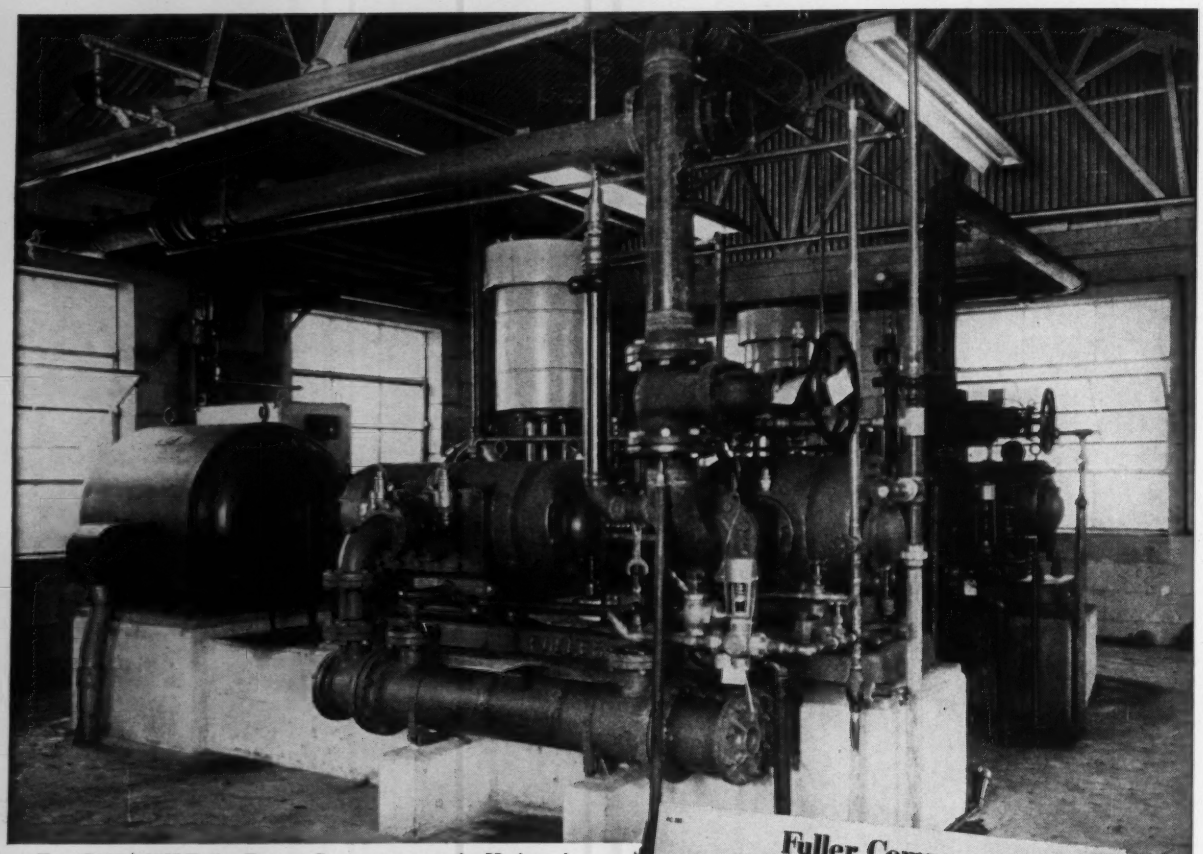
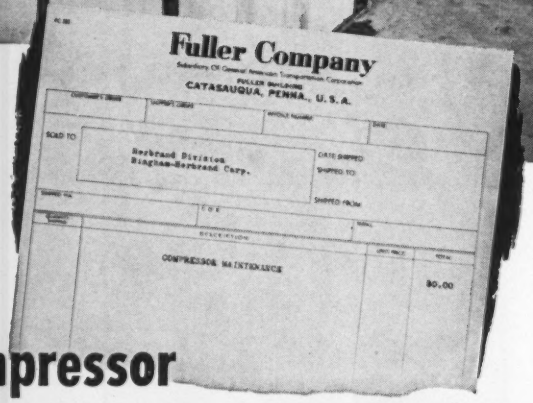


Two C135/135H Fuller Rotary Compressors at the Herbrand Division of the Bingham-Herbrand Corp., Fremont, Ohio, leading manufacturer of forged mechanics' hand tools and steel forgings for the automotive industry. Each compressor is rated 680 cfm, atmosphere to 100/110 psig., at 690 RPM.



Here's the 4-Year Maintenance Bill on Fuller Rotary Compressor at Herbrand Division of Bingham-Herbrand Corp.

So satisfactory was the performance of its first Fuller Rotary Compressor, installed in 1956, that Herbrand Division installed another like it 3½ years later.

When the older unit was inspected after four years operation, no replacement of parts was necessary. After installation of a new gasket (cost $9.35)—to replace the one that had to be removed to make inspection—the compressor continues to add to its service record.

The newer compressor has also been entirely trouble-free, and Herbrand plans a third, when increased air capacity is required. It, too, will be a Fuller—for, as Herbrand says, "These compressors can be classified as maintenance-free."

Because Fuller Rotary Compressors are practically vibration-free, they can be installed without complicated or expensive foundations or structural modifications. They are simple and efficient, with no valves to leak, no seats to grind. Blades automatically compensate for wear. They have forced-feed lubrication to all parts within the cylinder. Rotor, bearings and blades are the only moving parts.

Fuller Compressors range from 30 to 3300 cfm, pressures to 125-lb. gauge.

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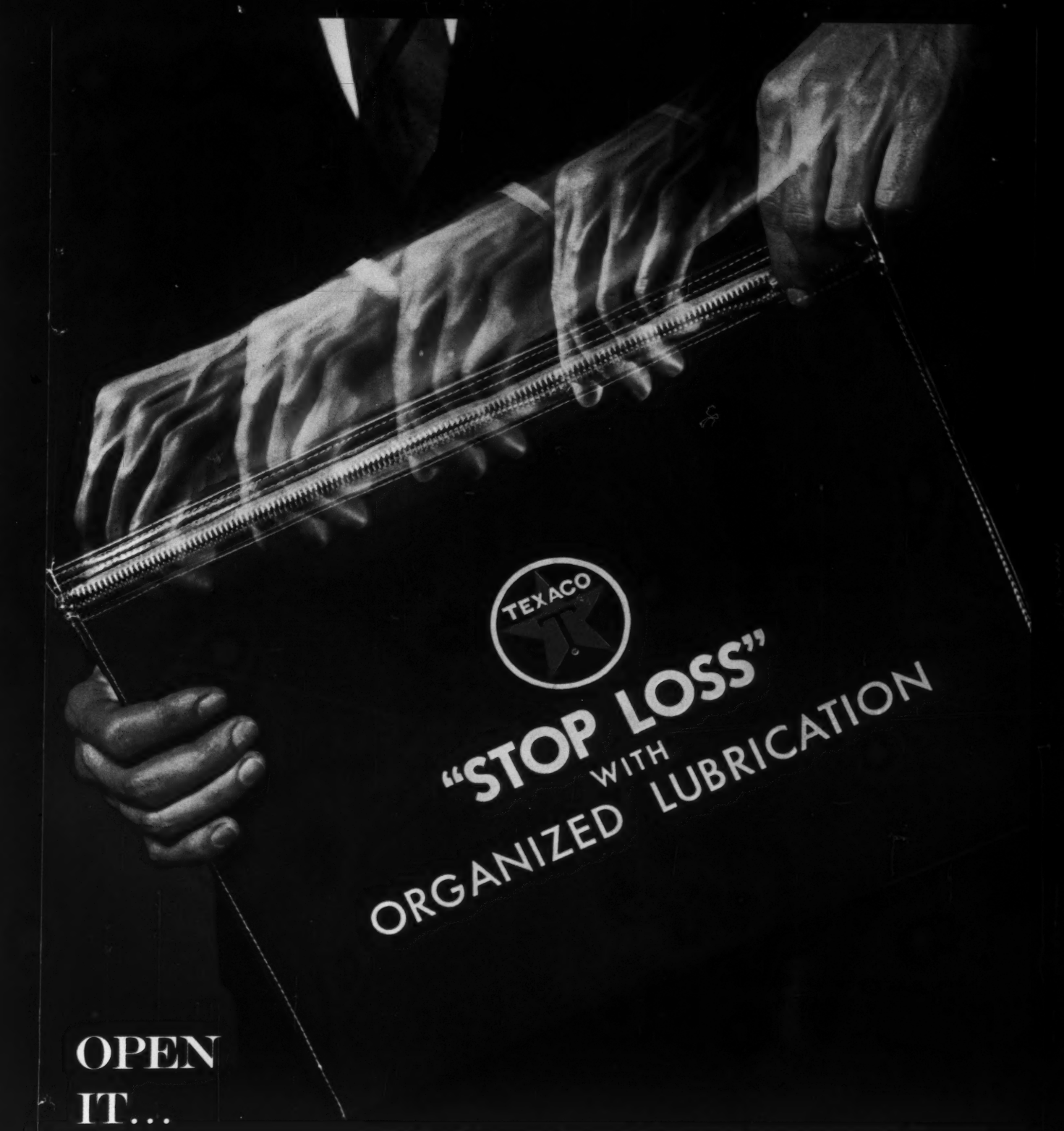

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General Foreman—Kennametal Carbide Engineer—Machine Operator

3-man team solves operating problem

. . . changed to fast-indexing insert tooling —speeded production—reduced costs

PROBLEM: High cost of production due to slow operation, tool breakage, and tool grinding.

SOLUTION: Job study by 3-man team recommended change from brazed-tip tools to Kennametal* throw-away insert type tooling.

RESULT: Stepped-up speeds and feeds, improved chip control, increased tool life, eliminated tool grinding—reduced cost of job 40%.

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Depth of on-the-job experience—plus the continuing development of a variety of tungsten, titanium, and tantalum carbide grades—has lead to the use of Kennametal compositions in practically every industry. And our product development group, by working in close cooperation with design engineers, sales engineers and customers, keeps coming up with new products and new applications—engineered and developed to meet both general and specific customer requirements.

We believe you will be interested in our booklet, "There's Profit in Retiring a Tradition," which gives facts on how some companies have reduced machining costs as much as 70 per cent. Based on actual cases, it makes practical and profitable reading. Ask your Kennametal Carbide Engineer for a copy . . . or write direct to KENNAMETAL INC., Dept. IA, Latrobe, Pa.

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■ **The editorials which appear in The IRON AGE, written by Editor-In-Chief Tom Campbell, bring many letters to the editor each week. Many readers agree with Mr. Campbell's editorials; many do not. Some typical letters follow.—Ed.**

Big vs Small

Sir—I have read your editorial "Rule by Fear: We Are Facing it!" in the June 22 issue. You complained about the Justice Dept. requesting that General Electric Co. promise that it will not charge unreasonably low prices which may create a monopoly. Also, you yelled "foul" when the U. S. government claimed that GE and other big companies are charging prices too high on government contracts.

May I write a few words to tell you why I disagree with your views?

First of all, these companies are very big and rely on volume in order to make attractive profits. I have a friend who owns a drug store. For a decade he was doing very well. Today he's in trouble. He can't make sales and can't get rid of the store because of a lease. Why? Because there are two chain stores on the same block. I believe that he will end up a poor man. Thanks to the chain stores.

Secondly, the U. S. government has the right to complain that companies charge too much for goods. The government has a lot of expense — especially on the missile projects — in order to defend us from the cancer of Communism. We, the taxpayers, pay our taxes to protect our freedom. To improve efficiency, the government has the right to find if certain companies are trying to cheat on the government and the taxpayer.

The companies are committing a very serious crime and pose a threat to the freedom of this country. I think they got off too lightly and I believe there are many more involved in these cases.

In another article of the same issue ("What's Next for Steel Prices?", p. 88) you brood about the government and its watchful eye on the steel prices. These steel companies have made a lot of profit--even at a low percentage of capacity. I don't see any reason why they should increase prices. What's more, steel prices are the prime factor of the inflation.

The U. S. government is trying its best to prevent us from walking into our own trap and the rise of Communism in the U. S. A. From your previous editorials, I get the idea you are a Communist hater. I hope that this letter will help you to look at the problems from a different angle.

I dare you to print this letter.—Alfred Sonnenstrahl, Silver Spring, Md.

■ **Dare accepted.—Ed.**

Imbued

Sir—After reading your editorial entitled "Rule by Fear: We Are Facing It!" in the June 22 issue several times, I have become imbued with the desire to pass it on to some of my friends.—W. L. James, Tulsa, Okla.

Many Thanks

Sir—May I thank you for the many editorials you have written that I have enjoyed, agreed with and passed on to my friends. I appreciate your short and powerful sentences which can have only one meaning and which can be understood by anyone who can read.

Please continue to comment on national affairs and the internal and external Communist conspiracy. —P. W. Rogan, Hartford, Conn.

Sacrifice

Sir—I have read Tom Campbell's editorial "Sacrifice for What? And Besides, Who Says So?" (IA—July 6, 1961) with interest. I find it very worthwhile. — Congressman Clarence J. Brown, Washington, D. C.

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HOW BIG PAYLOAD LPR's SHRINK HANDLING COSTS—Take the receiving operation itself: Users report that LPR's consume half the time required for conventional bundles of equivalent total weight; more LPR wire can be stocked per cubic foot, saving storage space and making it safer, easier to get at and faster to handle . . . housekeeping is improved, inventory control simplified; fewer stock transfers between storage and production departments lighten plant traffic. *LPR's save you time; LPR's save you money.*

HOW DSC LONG PRODUCTION RUN LPR's SLASH FABRICATING COSTS—Users report: Fewer coil changes and setup adjustments reduce downtime, increasing machine-man-hour output; LPR's put new vigor into older machines so they produce more efficiently, let newer, faster equipment perform at peak. *Greater productivity with LPR's means lower operating costs.*

HOW BIG PAYLOAD LPR's REDUCE MATERIAL COSTS—Every time you change a coil you build up remnant scrap and lose precious production time, too. LPR's need fewer coil changes, help you cut down cumulative scrap by as much as 90%, sometimes even more. As your scrap pile goes down your fabricating yield goes up and your unit material costs drop.

These Long Production Run savings are NET TO YOU because you pay nothing extra for LPR advantages.

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Manufacturers' and HC Specialty Wire
Welded Wire Fabric
Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
Cable Address DETROSTEEL—New York

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Following Auto Labor Negotiations

Back in 1958, assistant news editor Larry Neal covered the auto labor negotiations from start to finish.

So this year he was reviewing old scenes when he was assigned to return to Detroit to analyze demands and issues of the current negotiations. The story is this week's Special Report, p. 61.

But in some idle moments between trips to Ford, General Motors, Chrysler and American Motors, he teletyped the following message on working conditions:

Opening of auto negotiations also signals the start of just about the longest continuous, "floating" poker game in the country.

Inside Straights—The card games are played in the press rooms maintained by the auto companies at each of the negotiating sites. The environment differs at each of the companies.

General Motors maintains its press room on the fifth floor of the GM building in two small offices. One is set aside for card playing.

The other has the tools of the trade: Telephones, typewriters, paper, pencils, and press releases. It also holds a refrigerator stocked with cheese and crackers, soft drinks and, something new this year, possibly a reflection of progress, an ample supply of Metrecal.

Relax at Ford—Ford's pressroom is located in its new office building in suburban Dearborn. This is the largest and most plush of the "clubs." It has all the elements of soft living: TV, refreshments, and, of course, cards.

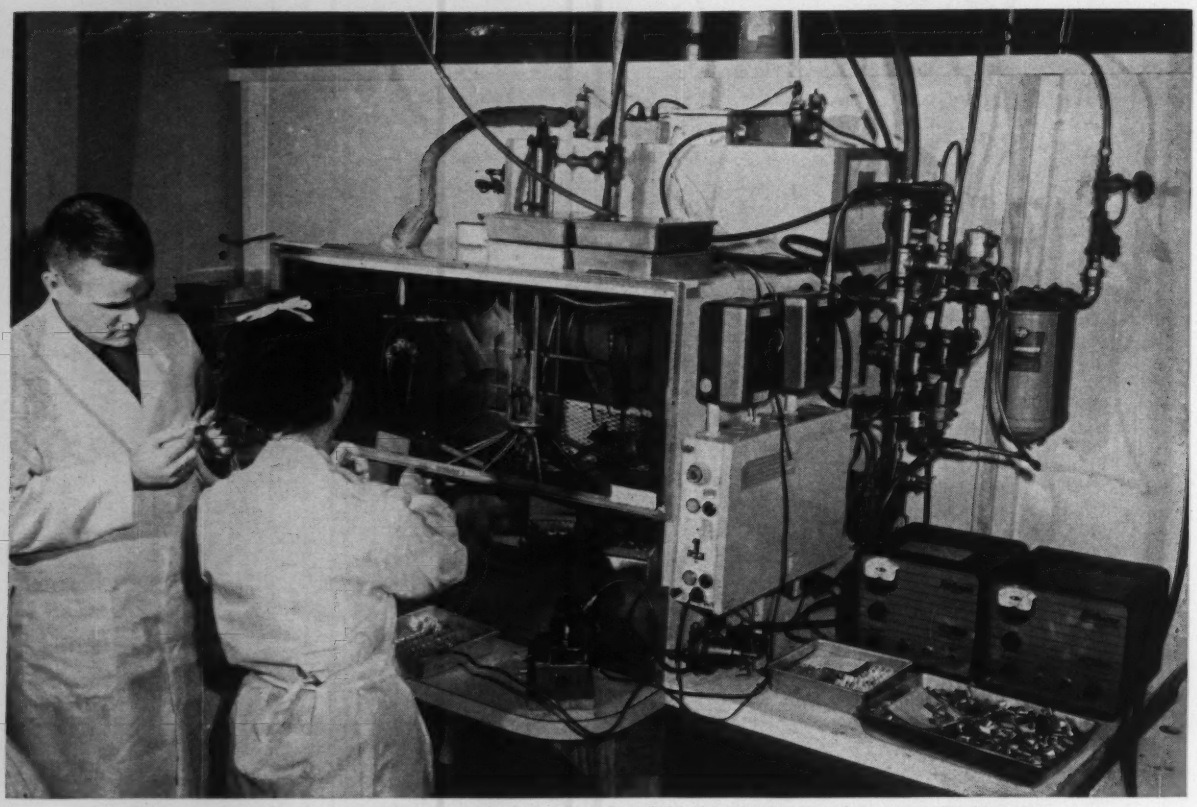
For Chrysler, the stronghold is a room behind the garage of the office building. The building has special memories for some reporters. It was Detroit's induction center during World War II.

American Motors traditionally conducts its negotiations at Detroit's Veterans Memorial Building, a white marble structure overlooking the Detroit River. A small room near the negotiation suite serves as a card parlor.

The Climax—For bystanders, big moment in the auto labor story comes when newsmen dash for the one telephone at American Motors. It's a modern version of the Ben-Hur chariot race.

AT WORK: Reporter covering auto negotiations is offered lunch (Metrecal) at GM pressroom in Detroit. Talks will continue through Aug. 31.

FLEXIBLE TUBING
Heavy Duty Interlocked
RUGGED AND STRONG FOR LASTING SERVICE
. . . that is Penflex Flexible Tubing. Especially engineered for punishing industrial service . . . to defy abrasion, crushing, heat in conveying liquids, chemicals, powders, granular material, semi-solids.
Penflex makes all types and sizes (1/8" to 24" I.D.) for every industrial application. For catalog and details write to Pennsylvania Flexible Metallic Tubing Co., Inc., Route 30, Paoli, Pa.
Penflexweld Corrugated
PENFLEX
TIGHT AS A PIPE BUT...
FLEXIBLE



Charles Parke, production engineer at the Potter and Brumfield plant, a division of American Machine and Foundry Company, spot checks a part while operator removes remaining components from the cleaning system.

"WE MAGNIFY EACH PART 10 TIMES . . . DON'T FIND GREASE AFTER A NIALK® TRICHLOR BATH"

Workers handle delicate miniature relays with utmost care in Potter and Brumfield's "white room." Yet some contamination with dust and grease is inevitable.

"We assume everything is contaminated," continues Charles Parke, production engineer—and orders all of the minute parts cleaned with Nialk TRICHLORethylene.

100,000 parts between cleanouts.

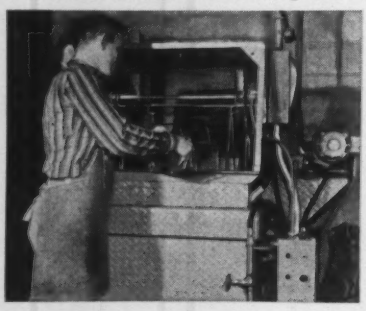
According to C. R. Stone, Director of Production, Nialk Trichlor removes the last bit of film on the metals. Potter and Brumfield degreases magnetic iron and nickel silver, running about 100,000 parts through between cleanouts.

They tried another vapor degreasing solvent, but "it didn't do the job Nialk Trichlor does. It wasn't distilling right and it wasn't doing the cleaning job."

Though much metal goes through every degreasing bath, this company doesn't have to titrate or run other tests.

Flush and vapor degrease—one trichlor

Potter and Brumfield uses one grade of trichlor for both flushing and vapor degreasing, considers this an important benefit.



And Mr. Stone concludes, "Hooker should get a large share of credit for the quality of parts produced by Potter and Brumfield."

You can get the same dependable cleaning with nonflammable Nialk TRICHLORethylene.

Hooker technical experts will help you set up your system. Then they'll check back with you regularly to make sure your flushing or degreasing operation stays trouble-free.

Talk to your Hooker Chemical distributor. He'll gladly help you with your problems and questions.

Or write us direct. We have years of experience to put at your disposal.

HOOKER CHEMICAL CORPORATION

307 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

COMING EXHIBITS

Plastics Materials Show—Applications Clinic, August 15-16, Santa Monica Civic Auditorium, Santa Monica, California.

National Chemical Show—Sept. 5-8, International Amphitheatre, Chicago. (Chicago Section, American Chemical Society, 86 E. Randolph St., Chicago 1.)

Industrial Building Exposition—Sept. 25-28, New York Coliseum.

MEETINGS

JULY

Cast Iron Pipe Research Assn.—Annual meeting, July 26-27, Seaview Country Club, Absecon, N. J. Assn. headquarters, Prudential Plaza, Suite 3400, Chicago.

AUGUST

American Astronautical Society—Fourth western regional meeting, August 1-3, Sheraton-Palace Hotel, San Francisco.

Personnel Management Conference—Cornell University's New York state School of Industrial and Labor Relations, August 1-4, Ithaca, New York.

Metallurgical Society of AIME—Semiconductors conference, Aug. 30-Sept. 1, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

SEPTEMBER

Air Moving and Conditioning Assn., Inc.—Annual meeting, Sept. 10-14, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, Guardian Bldg., Detroit.

International Industrial Conference—Sept. 11-15, Masonic Memorial Auditorium, San Francisco.

(Continued on P. 26)

SAFE, RELIABLE POSITIVE CONTROL

Convenience, positive control and protection for the operator are provided by the pistol-grip, push-button control station of the Coffing Quik-Lift electric hoist.

Loads can be raised or lowered while pulling a trolley mounted hoist since a strain cable is incorporated in the control cord. The control station is made of non-conducting, impact resistant plastic and the 115 volts at the station plus the interlocked push buttons make for safe operation. The V-type brake assures positive control of loads. Housing is of strong but light aluminum which makes for portability.

Ask your distributor about the twenty JF models with capacities ranging from ¼ to 2 tons or write for Bulletin ADH-65-CC.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center, Pittsburgh 22, Pennsylvania

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

Are you buying LAMINATED PLASTICS or VULCANIZED FIBRE... as raw materials or fabricated parts?

TAYLOR FIBRE CO. HAS 2 MODERN PLANTS TO SERVE YOU

NORRISTOWN, PA.
LA VERNE, CALIF.

and belongs as an approved supplier

Taylor has the products . . . offers more than 50 grades of standard laminates, a group of Tayloron® materials, pre-impregnated materials, molding compounds, and vulcanized fibre. Also filament windings and a number of composite materials, including sophisticated combinations of laminates, metals and rubbers.

Taylor has the facilities. Its Norristown, Pa., plant, comprising some 300,000 sq. ft., produces both vulcanized fibre and laminated plastics . . . is one of the most completely integrated in the industry . . . even makes its own paper and a large percentage of its own resins. The La Verne, Calif., plant, with over 45,000 sq. ft. of floor space, specializes in the manufacture of laminated plastics for the convenience of West Coast customers. Both plants can supply basic materials or parts fabricated from them.

Taylor has the service organization . . . maintains 13 strategically located offices staffed with men qualified to help in the selection and utilization of Taylor materials.

Write for a copy of our laminated plastics selection guide and other literature pertaining to our capabilities for producing materials and parts to your specification. Taylor Fibre Co., Norristown 52, Pa.

Taylor
LAMINATED PLASTICS VULCANIZED FIBRE

MEETINGS

(Continued from P. 25)

Society of Plastic Engineers, Inc. —Regional Technical Conference, Sept. 12, Central Indiana Section, Severin Hotel, Indianapolis.

Non-Ferrous Founders' Society—Annual meeting, Sept. 17-21, Shawnee Inn, Shawnee-on-the-Delaware, Pa. Society headquarters, University Bldg., 1604 Chicago Ave., Evanston, Ill.

AEC Welding Forum — Annual meeting (classified), Sept. 20-22, Southwest Research Institute. Institute headquarters, Granada Hotel, San Antonio, Texas.

Industrial Electronics Symposium —Sept. 21-22, Bradford Hotel, Boston. Institute headquarters, 51 East 42nd Street, New York 17.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

Assn. of Iron and Steel Engineers —Annual convention, Sept. 25-28, Penn-Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27-28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

American Production and Inventory Control Society—Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix, Arizona.

NEW 2H10

disc grinds parts to millionths

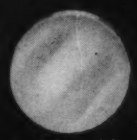
compact Gardner Double Disc Grinder finishes small precision parts at high output

This is the smallest machine in the Gardner 2H series. It is equipped with either 12" or 15" discs and 3, 5, 7½ or 10 hp motors.

grinds two surfaces parallel in one operation

disc grinds parts like these

counter pinions


contact lens blanks

ceramic insulators

magnet cores

small bearing rolls

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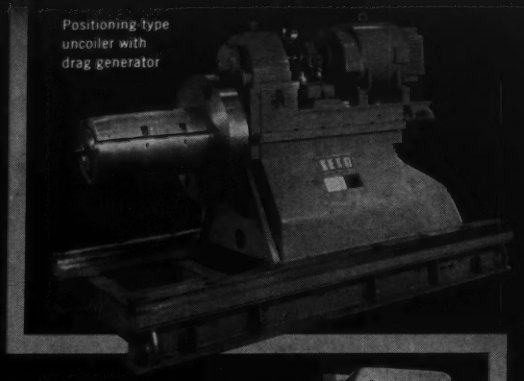
GARDNER

precision disc grinders

GARDNER MACHINE COMPANY, BELOIT, WISCONSIN

a subsidiary of Landis Tool Company



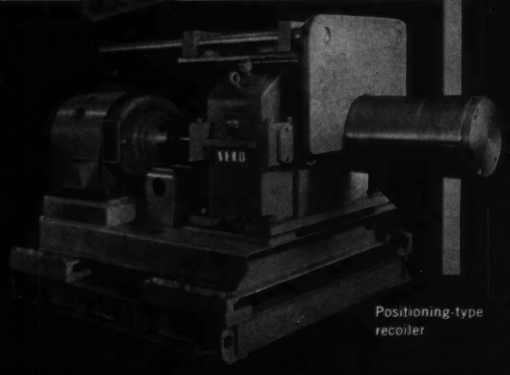
Positioning-type uncoiler with drag generator

Predictable Performance

for processing lines with

SECO

terminal equipment



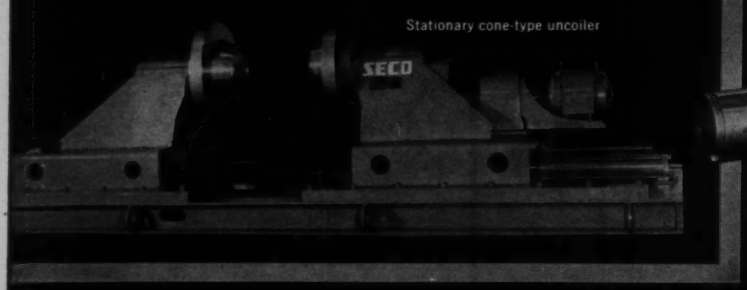
Positioning-type recoiler

From entry to exit, new and modernized processing lines . . . annealing, pickling and others . . . perform better with SECO terminal equipment. This equipment handles coils ranging from 10,000 to 50,000 pounds with speed, convenience, safety.

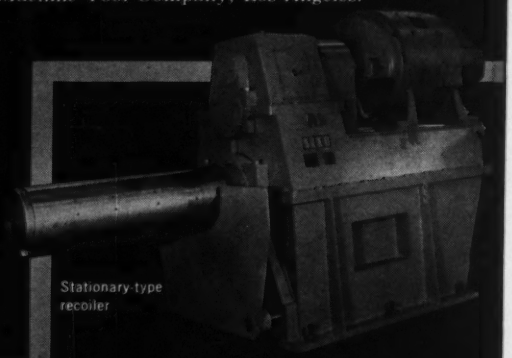
SECO uncoilers and recoilers are designed to operate at any speed the mill requires, are available in positioning or stationary types. The positioning types feature a slideable reel base mounted on a sub-base for alignment with the processing line, actuated by an automatic edge control.

SECO also makes auxiliary equipment such as coil cars with coil lifts to simplify uncoiler loading and recoiler unloading. Available for mandrel or cone-type reels.

A staff of trained sales engineers will assist you in finding the equipment best suited to your needs. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles.



Stationary cone-type uncoiler



Stationary-type recoiler

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

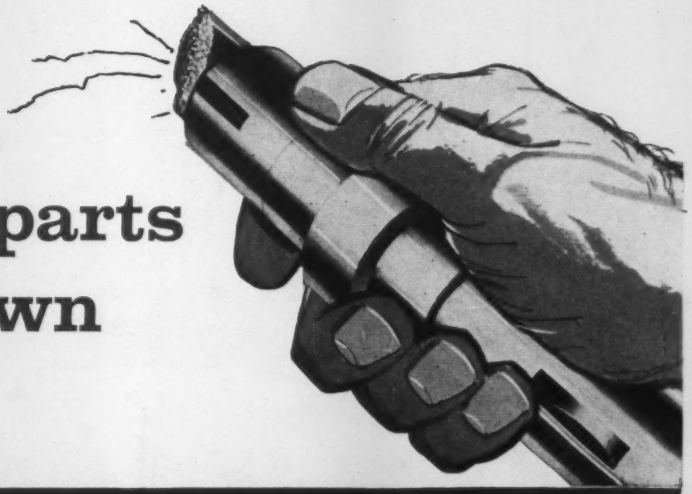
STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Affiliated with Lee Wilson Engineering Co., Inc.

Maintenance Departments

make repair parts faster, cut down time with..



LaSalle all-purpose STRESSPROOF® STEEL BARS ...for maintenance

A broken machine part? You can cut your down-time from days to hours by machining your own replacement parts from LaSalle all-purpose STRESSPROOF. There's no need to wait for a new part to be shipped from the factory...or to put up with the delays of heat treating and secondary operations.

Here's why STRESSPROOF *will help you get back into production faster (and minimize future breakdown possibilities):*

- STRESSPROOF needs no heat treating. *Now available in sizes up to 4" rounds.*
- It machines faster . . . rated at 83% of B1112.
- It's strong . . . 100,000 psi.
- It wears better.
- It costs less than heat treated in-the-bar alloys . . . and you can make most of your parts from just one stock of all-purpose STRESSPROOF.

STRESSPROOF IS AVAILABLE FROM YOUR STEEL SERVICE CENTER

La Salle STEEL CO. 1436 150th Street Hammond, Indiana

24-Page booklet tells complete story of all-purpose STRESSPROOF

Use this coupon to request your copy of "How to make your own machine and repair parts quicker and easier." It tells how to make parts like these easier and faster: *arbors • axles • bolts • bushings • fasteners • gears • spindles • shafts • studs, etc.*

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

Western BRASS

(Before)

(After)

The letterheads have been printed, signs made... and here we are wearing a new name. But in the mills things go on pretty much as they always have. We've put in some new machines and broadened our line... but essentially it's the people at Western (oops!) *Olin* Brass that really make the product. They *care*. That's the "Tailor-Made" approach.

If you're an old customer you know what we mean. If you're not – ask one of our users. Chances are he'll tell you the uniform quality and individual engineering of his metal has managed to save him money in inspection, fewer rejects and less lost time.

Olin Brass can do the same thing.

We're the same folks.

(Brass sales headquarters at East Alton, Illinois)

METALS DIVISION Olin
400 Park Ave., New York 22, New York.

You get more value for the same dollar in the NEW Bulletin 709 line of starters!

Size OO
1½ HP, 220 V
2 HP, 440/550 V

Size 5
100 HP, 220 V
200 HP, 440/550 V

This new line of Allen-Bradley motor control will change every idea you have had about starter size, performance, and life. The small size—especially in the higher ratings—is startling. Yet rating for rating the operating life and reliability have been increased many times. Built into each of the seven sizes of this new Allen-Bradley line is an ability to interrupt tremendous currents and to operate year in and year out for many millions of operations without trouble or maintenance.

The new Bulletin 709 starters are just as advanced in appearance as they are in performance. All seven sizes have an aristocratic styling and a distinctive family likeness. Brooks Stevens, famous industrial designer, has given the enclosures such an attractive, modern style that these new starters will prove a distinct sales asset on any machine or installation.

Why not write today for more information on this revolutionary new line of Allen-Bradley Bulletin 709 *quality* across-the-line motor starters?

Note the compactness of both the smallest and largest starter in the new Bulletin 709 line. Ratings up to 100 hp, 220 v; 200 hp, 440-550 v.

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis.

QUALITY MOTOR CONTROL

VR-65 faces stainless steel plate to 3-5 micro-inch finish for Goulds Pumps, Inc.

Grade VR-65 is maintaining a 3 to 5 micro-inch finish with superb tool life on a "316" stainless steel thrust plate for Goulds Pumps, Inc., Seneca Falls, New York. This very high "grind" finish is necessary to prevent excessive wear on the graphite part that bears against the plate in Goulds "Nuclear Canned Pump."

The plate is faced at 1220 rpm on a Hardinge Precision Chucker. The sfpm is 300 at the $1\frac{5}{16}$" inside diameter and increases to 765 at the $2\frac{3}{8}$" outside diameter. Feed is .0009" per revolution and depth of cut is .003". VR-65 produces twice as good a finish in half the time with six times longer tool life per grind than the previous method.

Performance such as this puts VR-65 in a class by itself. On your next machining problem, ask your V-R representative about VR-65 or other cutting tools in V-R's complete line.

CREATING THE METALS THAT SHAPE THE FUTURE

V-R VASCOLOY-RAMET

872 MARKET STREET • WAUKEGAN, ILLINOIS

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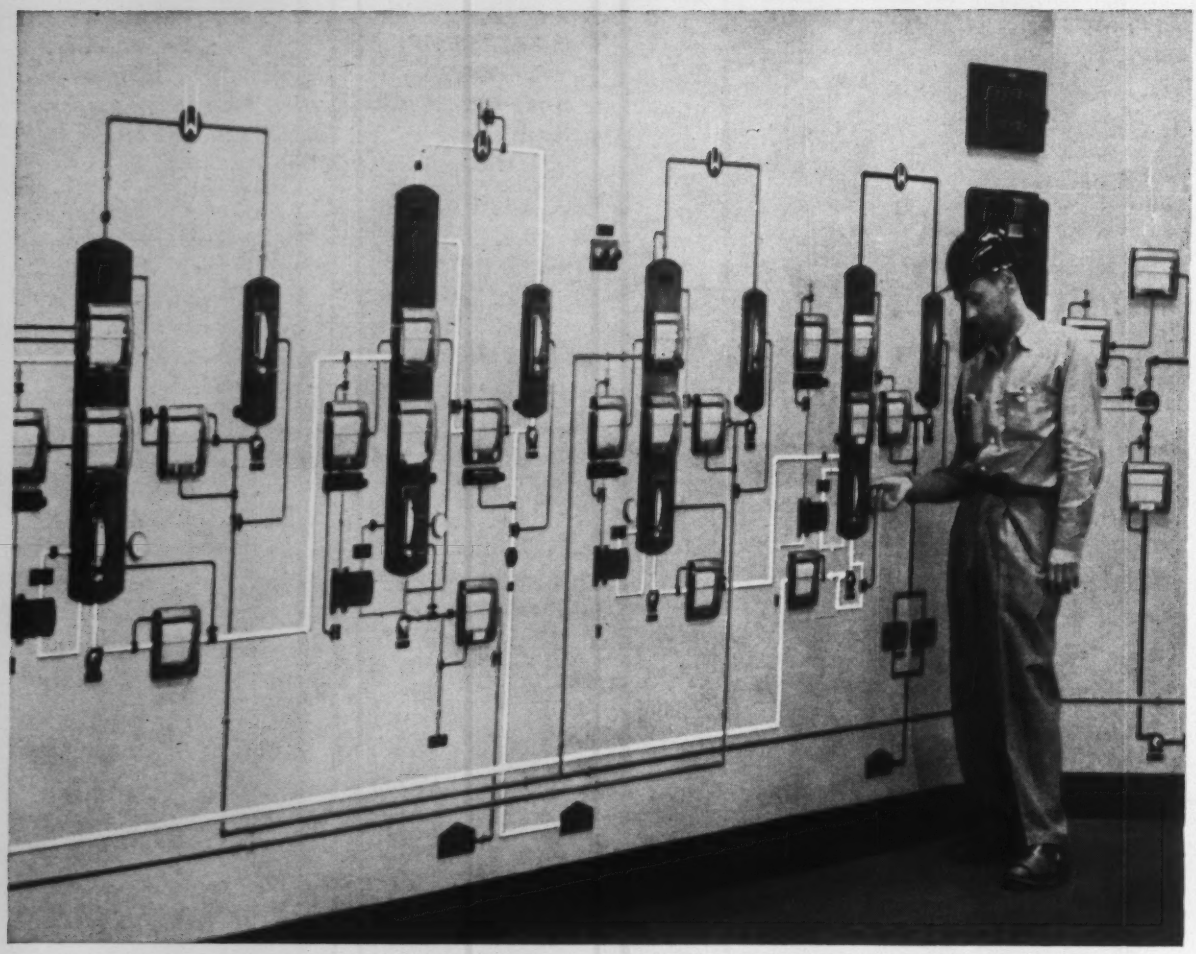
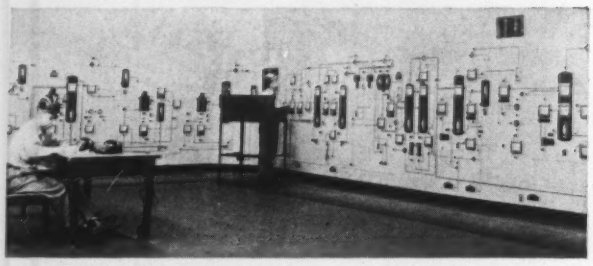


Foxboro Consotrols* "easy on maintenance" at U. S. Steel's Gary Works

Foxboro Consotrol Instruments have been in service 5 years at U. S. Steel's Gary Works, yet only a few have ever needed calibration. In fact, Gary Works reports that many of the Foxboro M/58 Controllers have never even had their covers off.

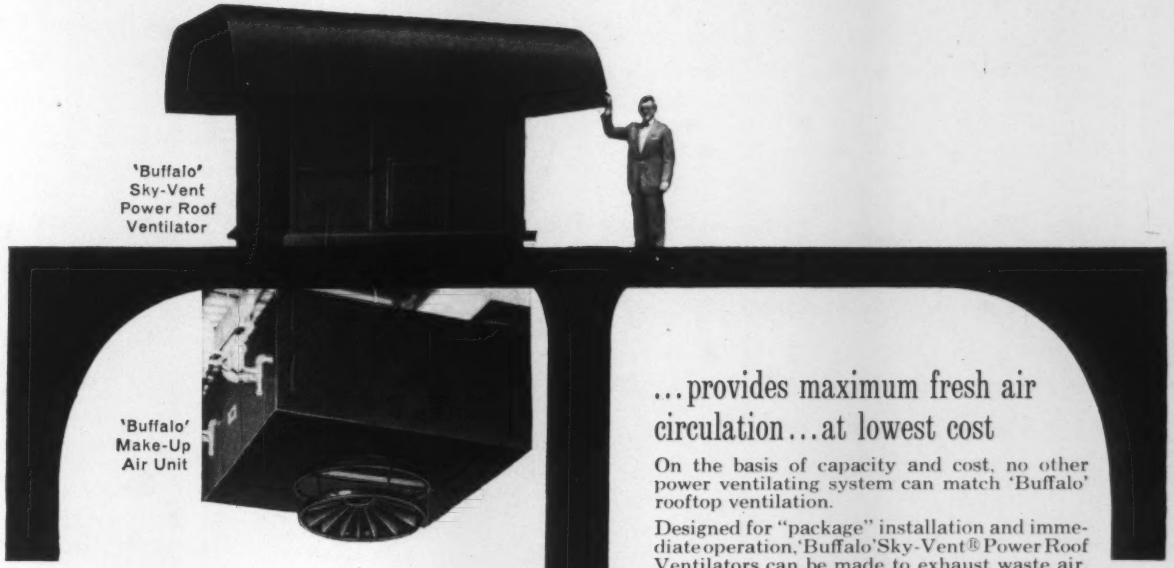
Low maintenance is just part of the Foxboro Consotrol story. Sustained high accuracy, precise repeatability, a full range of control functions — you get them all when you specify Consotrol instrumentation. Get full details in Bulletin 13-18, or call your nearby Foxboro field engineer. **The Foxboro Company, 807 Neponset Ave., Foxboro, Mass.**



83 foot graphic control panel for Gary Works Light Tar Distillation Plant was built by Foxboro in 1954. 250 Consotrol instruments record and control all temperature, pressure, flow and liquid level variables. *Consulting Engineers:* United Engineers and Constructors, Inc., Philadelphia. *Reg. U.S. Pat. Off.

FOXBORO

REG. U.S. PAT. OFF.



...provides maximum fresh air circulation...at lowest cost

On the basis of capacity and cost, no other power ventilating system can match 'Buffalo' rooftop ventilation.

Designed for "package" installation and immediate operation, 'Buffalo' Sky-Vent® Power Roof Ventilators can be made to exhaust waste air, or supply fresh air efficiently...in volume...*without ductwork of any kind.* Accessories such as filters, non-freeze heating coils, fresh and return air and face and bypass dampers can be supplied in stack of roof ventilator above roof level instead of in separate companion heater sections below roof level where desired.

Where extremely large amounts of air must be exchanged continuously, the tremendous air moving capacity of larger size 'Buffalo' units means that fewer units and roof openings are required...equipment and installation costs are held to an absolute minimum.

Available in 1000 through 250,000 cfm capacities with 12" through 120" wheels, 'Buffalo' Sky-Vents® ventilate entire plants...or sections of plants...with no interference to lighting, overhead handling systems or production line layout.

Rugged 'Buffalo' construction features tubular-braced hoods and stacks capable of withstanding the heaviest snow loads and hurricane force winds. All units are supplied with corrosion resistant coating.

'Buffalo' MAKE-UP AIR HEATER SECTION used under Style "H" Sky-Vent®. This high capacity heating and/or filtering unit for use with 'Buffalo' rooftop power ventilators...requires no ductwork. Available in any combination of fresh and return air dampers, face and bypass dampers, filters, non-freeze heating coils, or reverse design wheels for summer exhaust.

Your nearby resident 'Buffalo' representative has the complete story on these versatile ventilating packages. Give him a call, or write home office for Bulletin 2345.

'Buffalo' ROOF-TOP Ventilation

"Buffalo"

AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

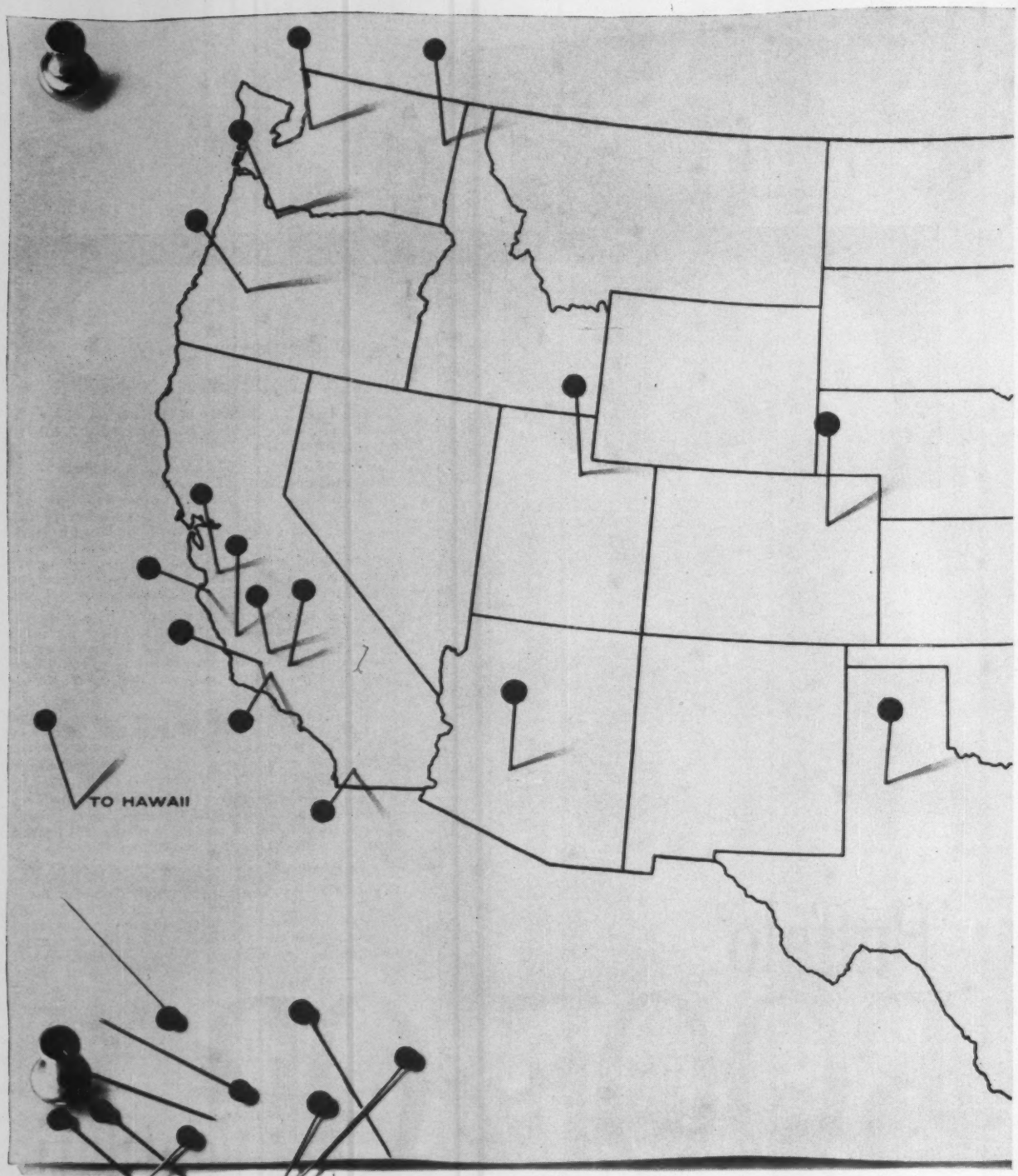
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

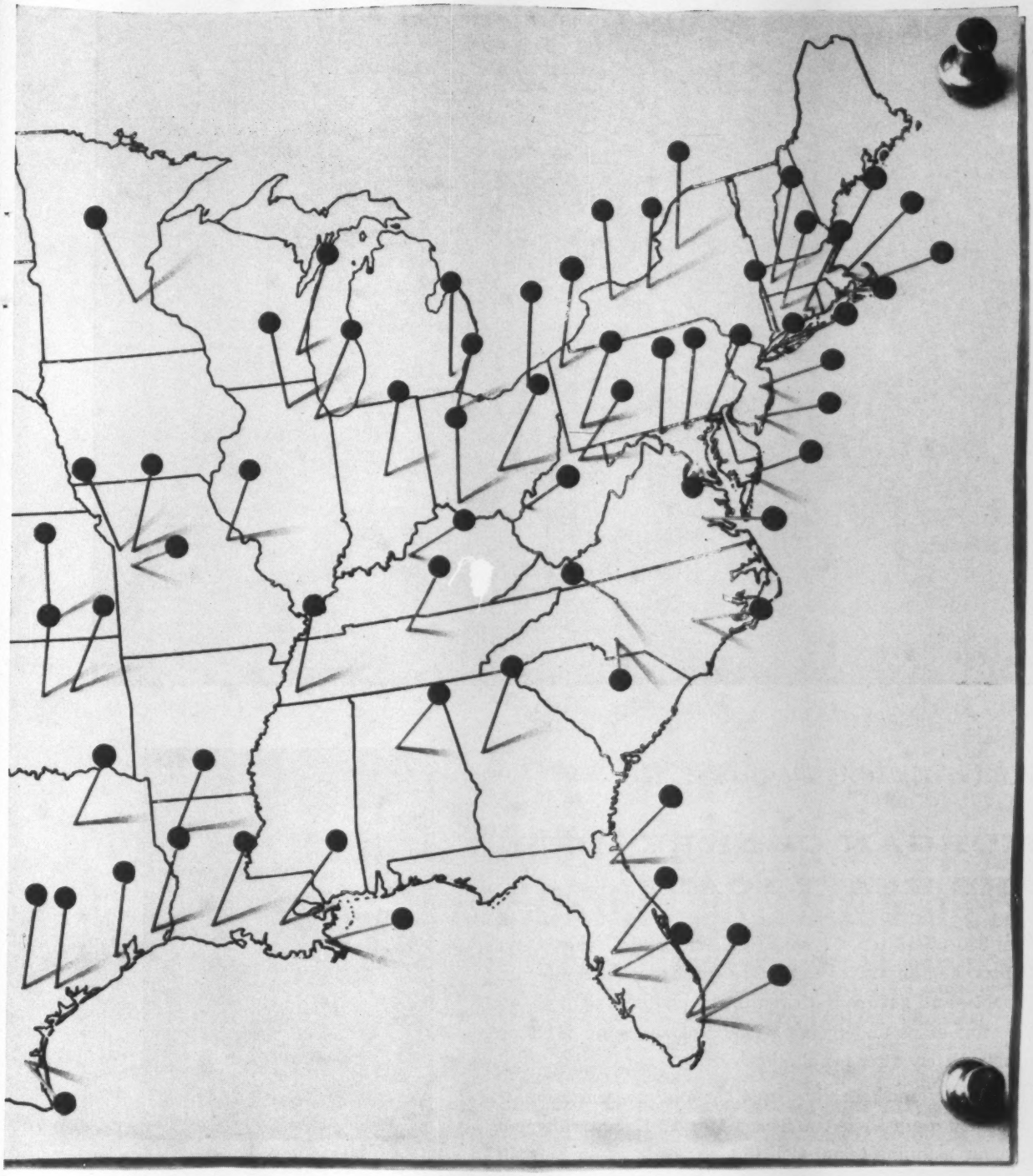
'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.



Pin-pointed supply

Wherever you are, Eastern Stainless Steel is close by. Whatever you may need to meet your schedules, it will be sped to you from one of Eastern's supply centers in 83 cities. Whenever you need stainless sheet, plate, coil or strip, Eastern will see that you get it. Phone, teletype or visit Eastern Stainless where your delivery dates are our chief concern; your satisfaction, our chief aim.



FREE BOOKLET—Full color, 16 pages. Useful data on stainless steel . . . types, size range for converted plates, Sendzimir and handmill limitations, finishes available, etc. Send coupon now for your free copy.

EASTERN STAINLESS STEEL
BALTIMORE 3, MARYLAND

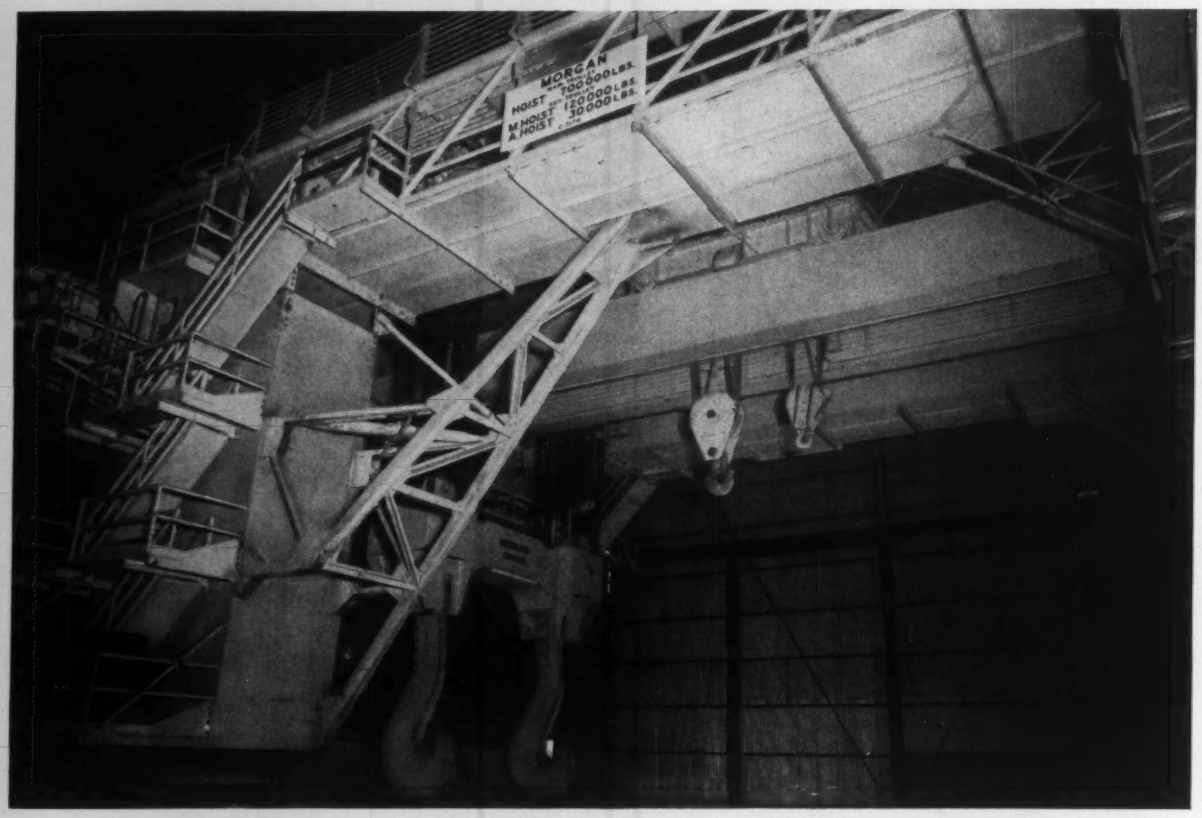
Eastern Stainless Steel
Baltimore 3, Maryland

Name_____

Company_____

Address_____

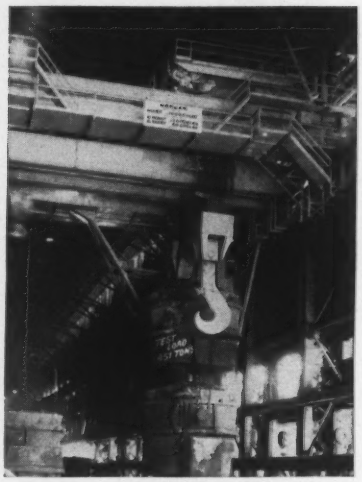
City_____ Zone____ State_____



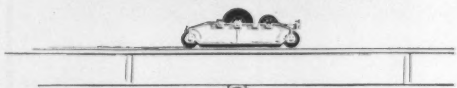
At Granite City Steel...

MORGAN CRANES MOVE THE HEAVY LOADS

This 350/60/15 ton, 67′ span, ladle crane at Granite City, Illinois, demonstrates the extra quality steel companies expect—and get from Morgan. The photo at right shows the same crane undergoing a load test—carrying 451 tons—immediately after installation.



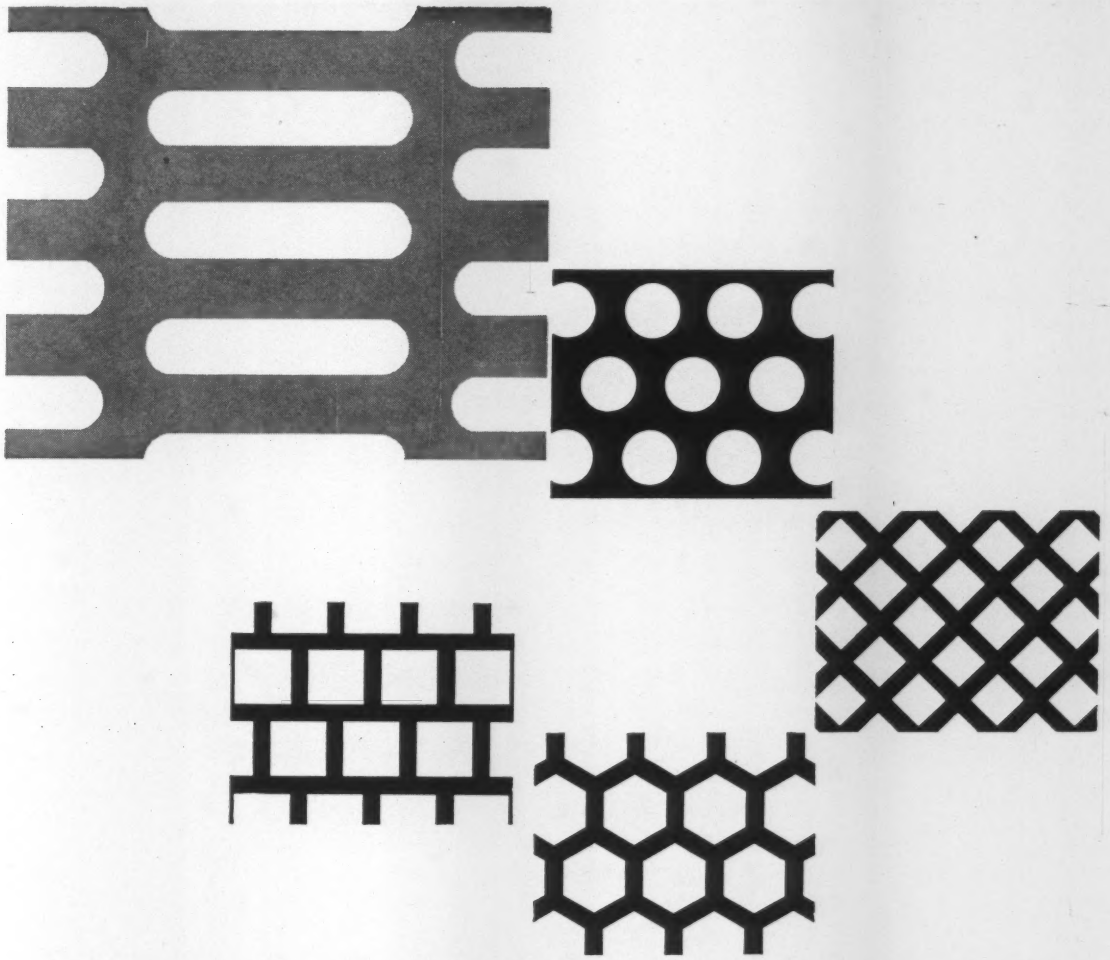
Efficiency and reliability in either mill modernization or expansion result when you have a Morgan Engineering man on your planning team. Call him to get facts on Morgan cranes and other Morgan mill equipment that will help speed production and lower your costs.



THE MORGAN ENGINEERING CO. *Alliance, Ohio*

EMCI MEMBER

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws, auxiliary equipment and welded fabrications.



put an extra plus in new products... HENDRICK perforated metal

Metalworking fabricators well know the importance of adding to product appearance **while the product is in the design stage.** That's why so many design engineers come to Hendrick for advice. Hendrick's vast stock of dies and perforating experience are invaluable aids to manufacturers planning new design application and product development.

Hendrick perforated metals are available in a wide variety of patterns in every commercially rolled metal. Hendrick also perforates masonite, rubber, plastic and insulated board. Each can be supplied in a large number of sizes in plain or panel effects. Hendrick perforated metal is available in round, hexagon, square, slot and diamond openings. Mail the coupon for more information.

HENDRICK Manufacturing Co.
Carbondale, Penna.

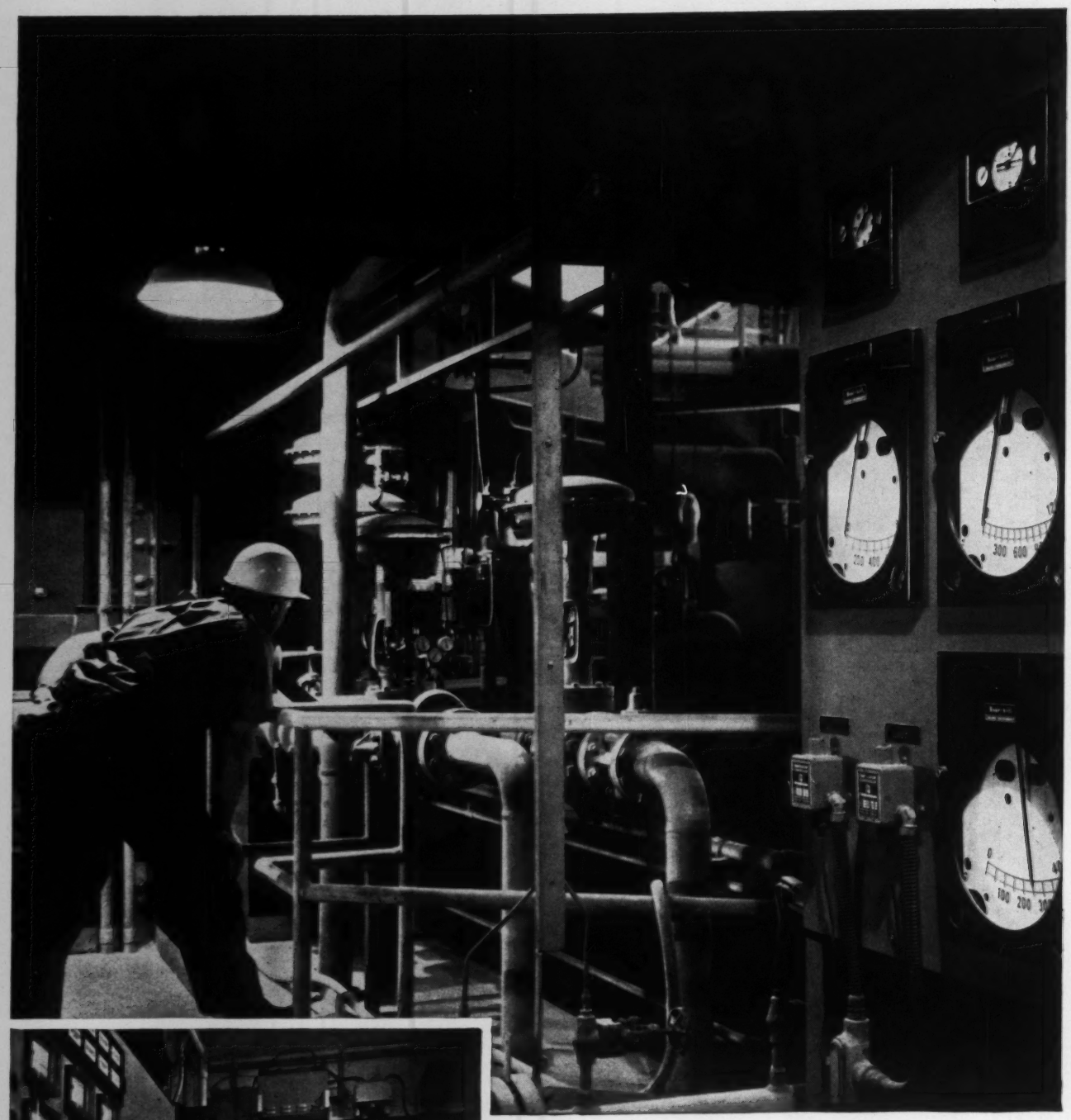
Perforated Metal Screens • Wedge Wire Screens • Cascade Wedge Wire Screens • Wedge Slot Screens • Rubber Clad Perforated Screens • Flanged Lip Screens • Flights • Shaker and Conveyor Troughs

HENDRICK Manufacturing Company
Carbondale, Penna.

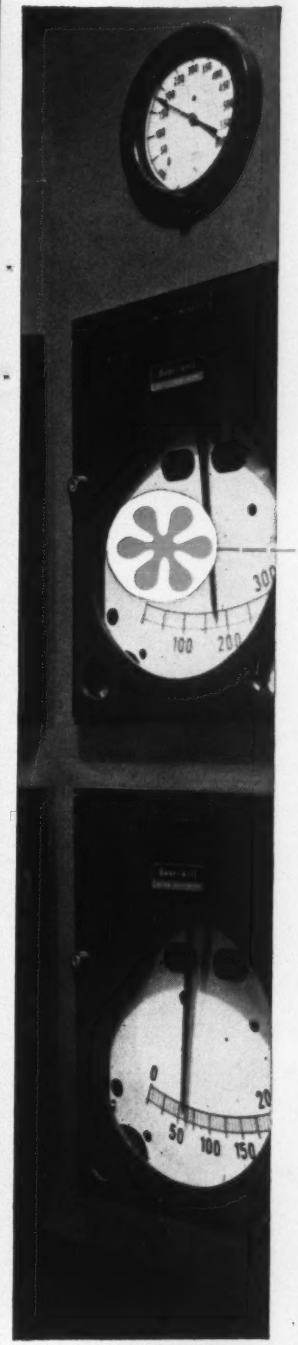
Gentlemen:

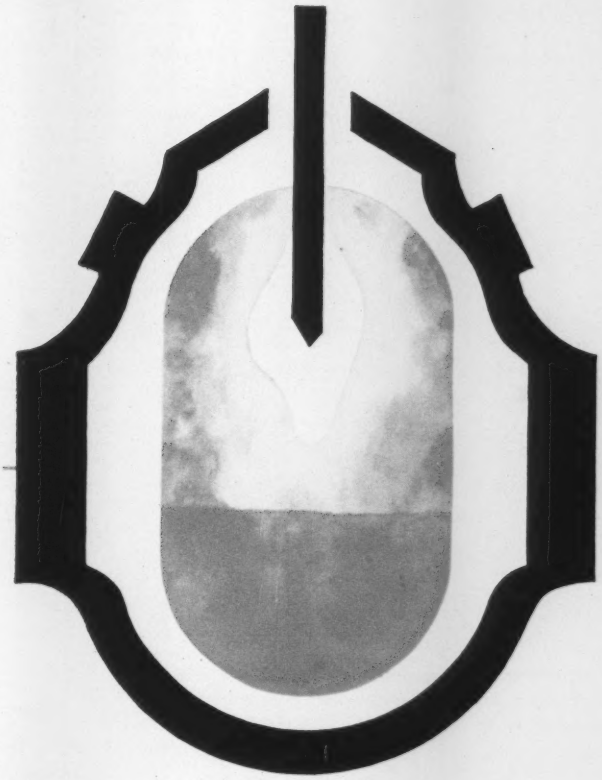
☐ Please have representative call.
☐ Send me FREE literature on Perforated Metal.

Name _____
Title _____
Company _____
Street _____
City _____ State _____



At Kaiser Steel Corporation, Fontana, California, this Honeywell system helps double plant capacity by controlling oxygen mass flow, lance position, lance cooling water temperature and pressure, and other critical variables. At left, an operator watches charging of one of the three new oxygen converters from a window in the control pulpit.





Why did Kaiser select Honeywell instrumentation for its L-D process?

At the Fontana plant of Kaiser Steel Corporation, Honeywell instruments were selected for the new basic oxygen steelmaking shop. This new process required instruments that were accurate, reliable, and fast enough to deliver the precise integrated control needed.

Kaiser Engineers called on Honeywell to furnish the necessary control instruments.

If you're planning to use the oxygen process—in converter or open hearth—you'll find it profitable to have Honeywell design your entire control system, complete from primary elements to computer, and tailored to the particular requirements of your mill. Your nearby Honeywell field engineer can give you complete details. Call him today—he's as near as your phone.

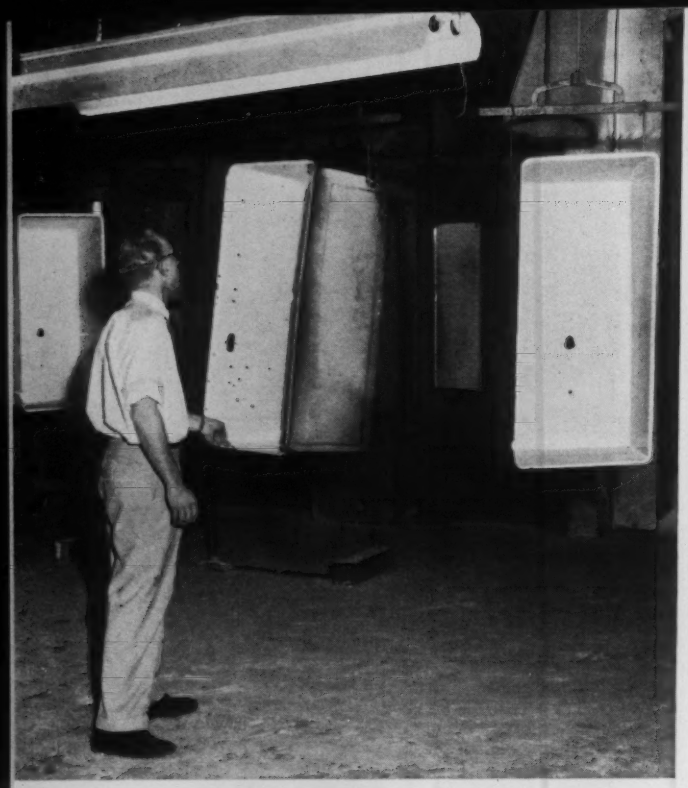
MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

First in Control

SINCE 1885

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.



Direct-on enameled food liners pass the watchful eye of an inspector as they leave oven. Direct-coated Bethnamel food liners, which comprise some 75 pct of plant's output, have eliminated corner brushing. They are free from fishscaling, boiling, and gassing defects.

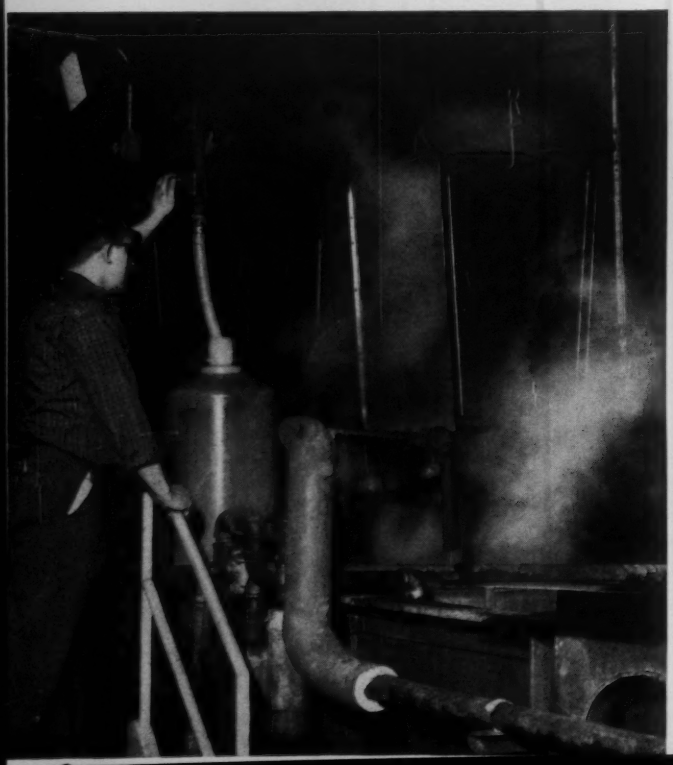
Finished refrigerator shows direct-coated liner and crisper pan in place. Westinghouse also considers Bethnamel a top-quality sheet even for parts that have to be two-coated. And there's no cost penalty—the price is the same as for conventional enameling iron.

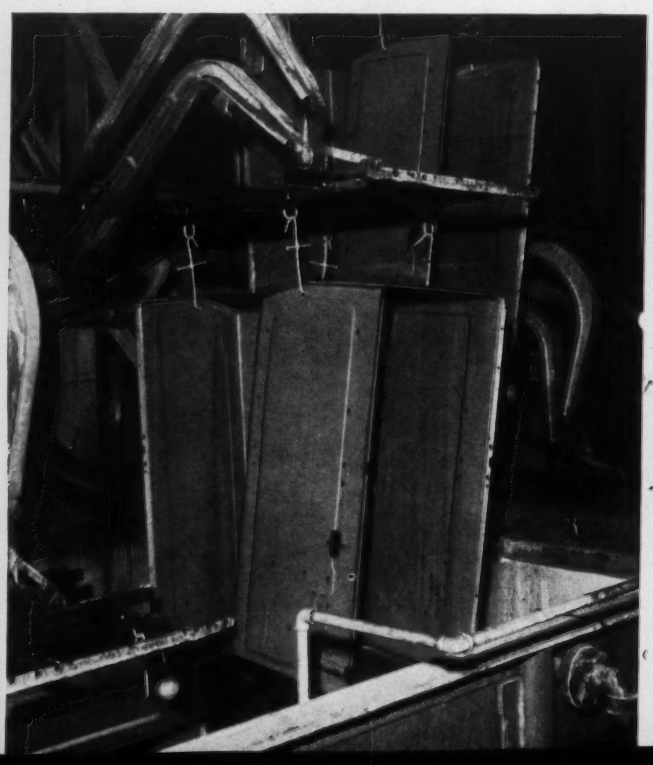
Steel

for Strength
. . . Economy
. . . Versatility

Here you see sulphuric acid being added to ferric sulphate pickle solution, to maintain an operating pH limit of 1.3 (±.1). The metal removal is controlled at about 2 gr per sq ft. Bethnamel performs well in this bath.

After the acid bath and rinse, the liners enter a nickel flash in de-ionized water. Westinghouse aims at a nickel deposit of .1 gr per sq ft minimum. Here the pH runs about 3.0 to 3.1.





How Westinghouse uses Bethnamel in direct-on porcelain-enamel process

Here's how Bethnamel... ***Cuts work-processing time • Lowers enameling costs • Improves finished product***

Westinghouse was one of the first to do extensive plant work in the development of the direct-on finish process for production runs of porcelain enameled products. They were quick to take advantage of the almost-zero carbon content of Bethnamel, the new porcelain enameling sheet developed by Bethlehem.

They Use Ferric Sulphate-Sulphuric Acid Pickle

At their Columbus, Ohio, plant, Westinghouse is now using Bethnamel in production of refrigerator food compartments and crisper pans. They prepare the Bethnamel steel surface for excellent adherence and appearance by a metal preparation system developed in the laboratories of a frit maker. This involves a ferric sulphate-sulphuric acid pickling process.

Enamel used at Columbus plant was chosen on basis of resistance to crazing at food-liner corners. After the spray operation, it is fired at 1525 deg F in a 64-ft hot zone at line speed of 22 feet per minute.

Enameling Time Cut by 25 per cent

Results have equalled or bettered those obtained in the conventional ground-and-cover-coat system. Bethnamel's negligible carbon content eliminated boiling and fishscaling problems. Work processing time has been reduced about 25 pct during the enameling operation, and enameling costs were significantly lowered through elimination of the ground coat. Westinghouse has found that Bethnamel welds much more uniformly than enameling iron.

May we send you Folder 734?

Bethnamel's superior performance in the porcelain enameling of a wide variety of products has established this remarkable sheet as the new standard of the industry. You can enjoy Bethnamel's advantages at a cost no higher than that of ordinary enameling iron. Let us send you Folder 734. Ask our nearest sales office or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

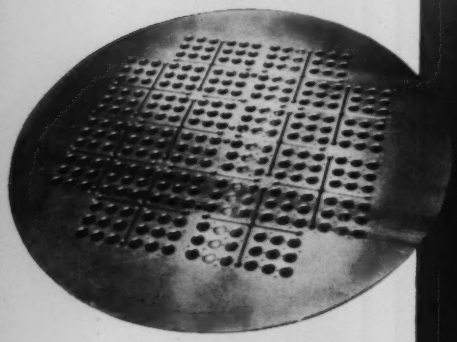
BETHLEHEM STEEL

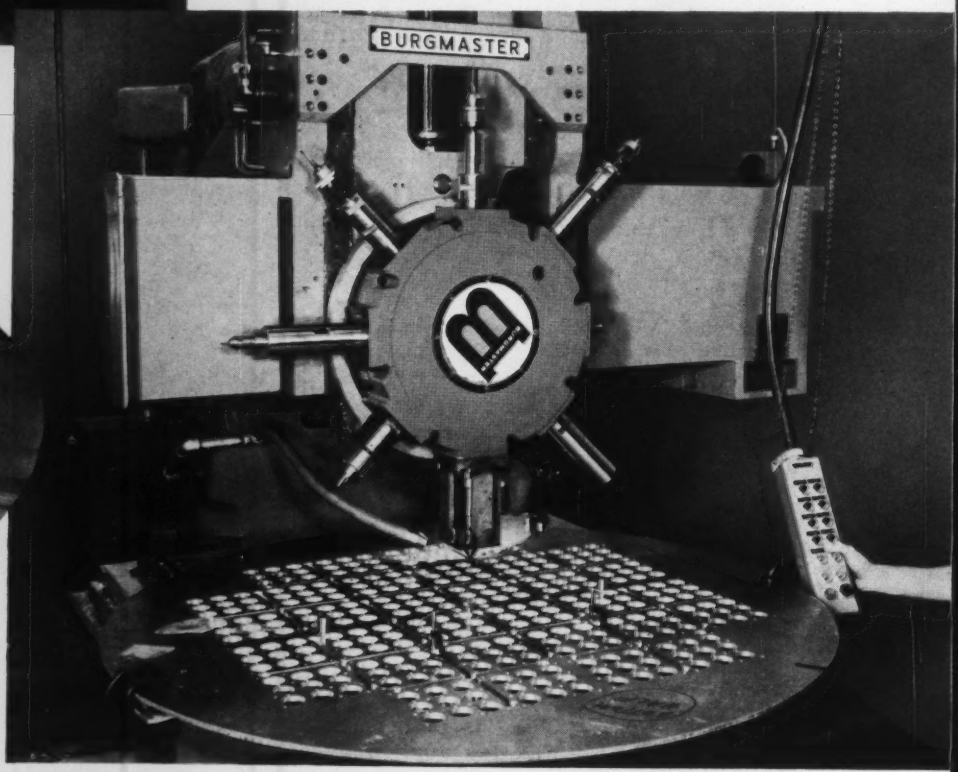
BETHLEHEM STEEL

GENERAL ELECTRIC USES

Burgmaster TAPE

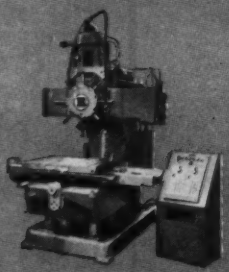
- **Production Speeded from 8 Weeks to 9 Days**
- **Saves 60 Hours of Lead Time**
- **$800.00 Fixture Eliminated**



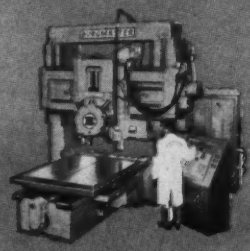


Burgmaster Model 3BHT
8-spindle, 1½" capacity in steel. Table travel 20x30, 30x45.

Model 25AHT
6-spindle, 1¼" capacity in steel. Table travel 15x26, 20x30, 30x45.



Model 2BHT
6 spindle, ¾" capacity in steel. Table travel 10x18, 15x26, 20x30



Model 3BHT-B Double Housing Planer Type
8-spindle, 1½" capacity in steel. Table travel 48x60.

CONTROLLED TURRET DRILLS

TO PROGRAM 2,098 OPERATIONS EACH PART

(General Electric Company, Atomic Power Equipment Dept., San Jose, Calif.)

● *Tape-Controlled milling operations* are now added to the versatility of the Burgmaster Model 3BHT, 8-spindle tape-controlled Turret Drills. At General Electric's San Jose facility, 10 slots .176" wide and 3½" long, and 24 slots ⅜" wide and 10" long are milled in a 6061-TC aluminum nuclear reactor grid plate ⅜" thick. These milling cuts are rough and finish, both sides, and are all programmed in tape. 1962 additional center drill, drill, bore, ream and tap operations necessary to complete each unit are also programmed in tape and performed by the Burgmaster Model 3BHT with push-button control. All holes are held to .004" true position over entire area. In this operation, production has been speeded from 8 weeks to 9 days, 60 hours of lead time have been saved and an $800.00 fixture eliminated.

JOB FACTS

Company: General Electric, Atomic Power Equipment Department, San Jose, California.

Machine: Burgmaster Model 3BHT—"GENERAL ELECTRIC MARK II" Tape-Controlled Turret Milling, Drilling, Tapping and Boring Machine.

Part: Nuclear Reactor Grid Plate. ⅜" x 55½", diameter.

Special Attachments: Milling, Reciprocating Drilling, 3-Dimensional.

Lot Size: 2

Tolerance: .004" of True Position Over Entire Area.

Holding: 2 Pins on Sub Plate, Simple Clamps.

Machine Operations: Total 2,098 Machine Operations.
288 holes—center drill, drill, bore and ream (4)
384 holes—drill (1)
128 holes—drill and tap (2)
60 holes—drill and bore (2)
50 holes—drill (1)
10 slots—mill, rough and finish both sides (4)
24 slots—mill, rough and finish both sides (4)

Former Method: Individual Milling and Drilling Machines with Drill Fixtures.

Present Method: All operations programmed in tape for Burgmaster Model 3BHT.

Savings: 31 Days, 60 hours lead time, $800.00 fixture.

Other Advantages: Greater Accuracy, Less Cost. No Scrap Loss, Eliminates Operator Fatigue.

World's Largest Builder of Turret Drilling Machines

"0" Manual Power Index ¼" Capacity

1C Manual Power Index ⅜" Capacity

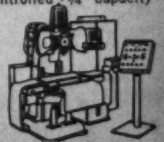
2B Manual Power Index ¾" Capacity

2BR Ram Type Radial Drill ¾" Capacity

2BH Automatic Hydraulic ¾" Capacity

3BH Automatic Hydraulic 1½" Capacity

25AH Automatic Tape Controlled 1¼" Capacity


2BHT-3BHT Automatic Tape Controlled ¾" and 1½" Capacity

Send for Literature

Write for bulletin describing Burgmaster 6 and 8 Spindle Tape Controlled Turret Drilling, Tapping and Boring Machines. Forty minute 16 mm sound film showing all Burgmaster Turret Drills in operation is available without charge from any office.

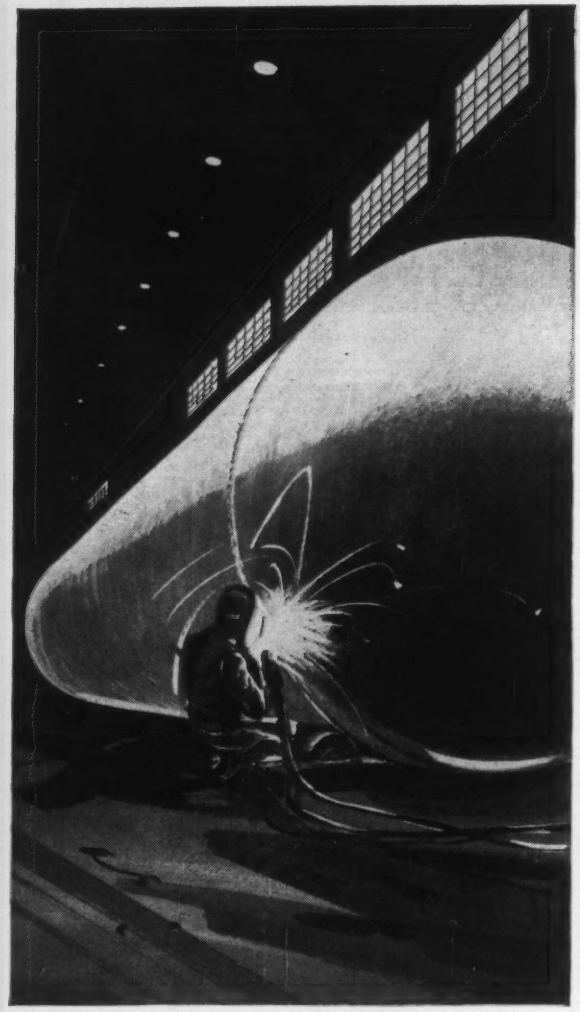
Burgmaster CORPORATION

15001 S. Figueroa Street • Gardena, California • FAculty 1-3510 DAvis 9-4158
BURGMASTER DIRECT SALES OFFICES: Ridgewood, New Jersey, 86 North Maple Avenue., Gilbert 4-3002 • Chicago 5, Illinois, 4908 Lincoln Ave., LOng Beach 1-1178 • Cleveland 7, Ohio, 14706 Detroit Ave., ACademy 6-7030 • Detroit 37, Michigan, 13730 W. Eight Mile Road, LIncoln 8-4333 • Northern California, Castro Valley, JEfferson 7-1650 • Kearney & Trecker, C.V.A. Ltd., Sole Agents for Great Britain, British Commonwealth and Western Europe.

SSS 100 ALLOY STEEL

Tensile Strength....115,000 psi minimum
Yield Strength .....100,000 psi minimum
Elongation (in 2")....18% minimum
Reduction in area.....50% minimum

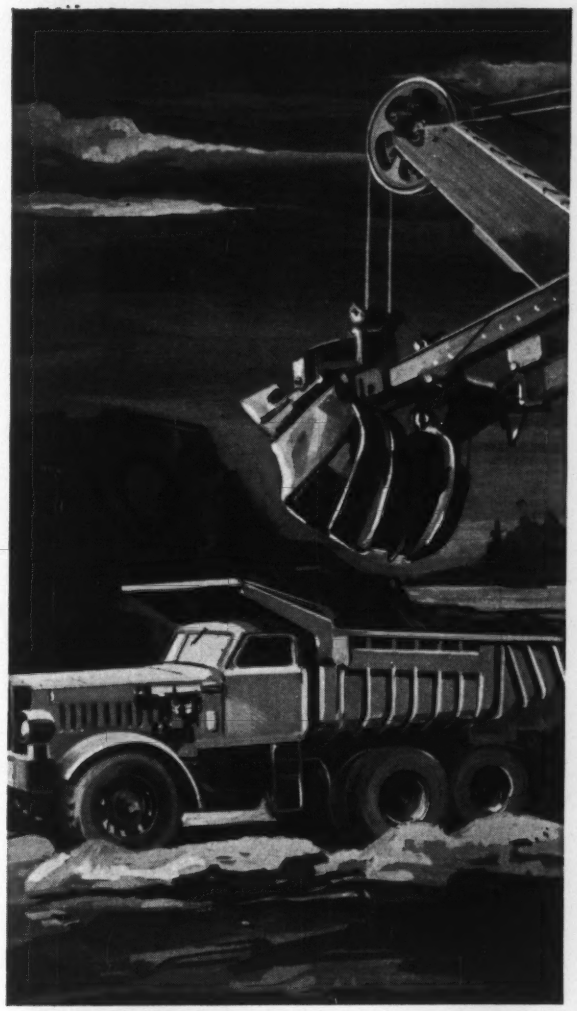
May be furnished to requirements of ASTM A-300 at –50° F in firebox or higher quality levels.



Add Strength . . . Subtract Weight . . . Multiply

New, quenched and tempered alloy constructional steel offers unique combination of toughness and weight-saving.

Check the "specs". They speak for themselves. Sheffield's SSS-100 is approved for use in welded pressure vessels according to the requirements of Section VIII of the ASME Boiler and Pressure Vessel Code, (case No. 1298, special ruling).



Savings . . . Build with new Sheffield SSS-100

(Triple S-100)

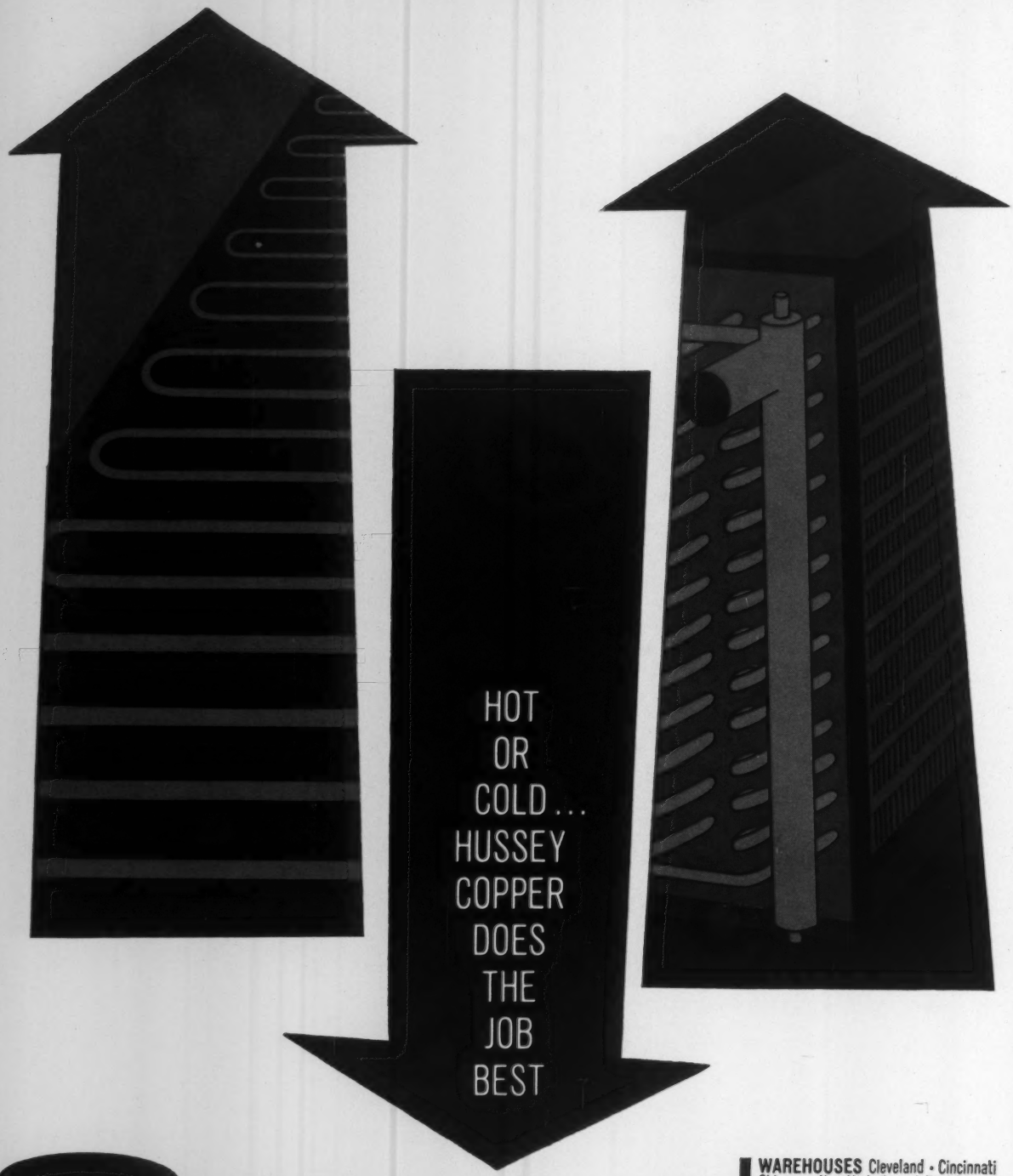
It is recommended not only for pressure and storage vessels, but also for bridges, earth moving machinery, transport equipment, missile and ground support equipment, and many fabricated structural shapes.

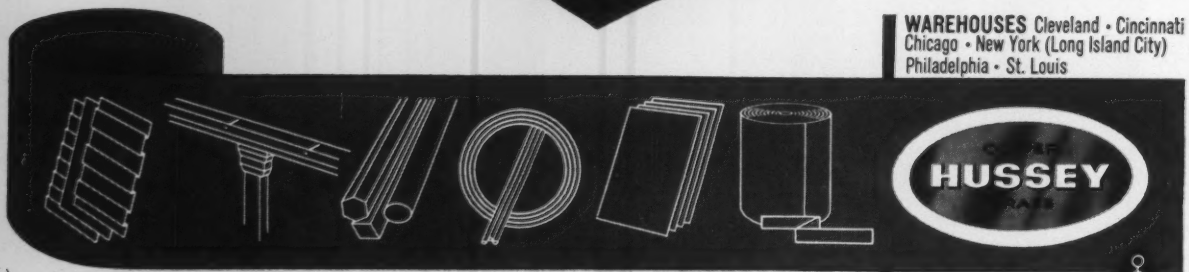
It's the right answer wherever you need less deadload, more payload. With SSS-100 you can design with lighter components without sacrificing strength. It is easier to weld and fabricate. Affords greater resistance to wear, atmospheric corrosion and impact, gives longer service with lower maintenance costs.

Sheffield SSS-100 is available now in plates from 3/16 to 2", in blooms and billets for forging and heat treatment. Heat-treated bars can be furnished on inquiry. Where unusual resistance to abrasion is required, it can be supplied heat treated to 321 minimum Brinell.

Complete Information and Technical Service are available without extra charge. Write **Sheffield Division, Armco Steel Corporation, Attention Alloy Sales, P. O. Box 3129, Houston 1, Texas.**

ARMCO Sheffield Division





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Chicago • New York (Long Island City)
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C. G. HUSSEY & COMPANY ▪ PITTSBURGH 19, PA.

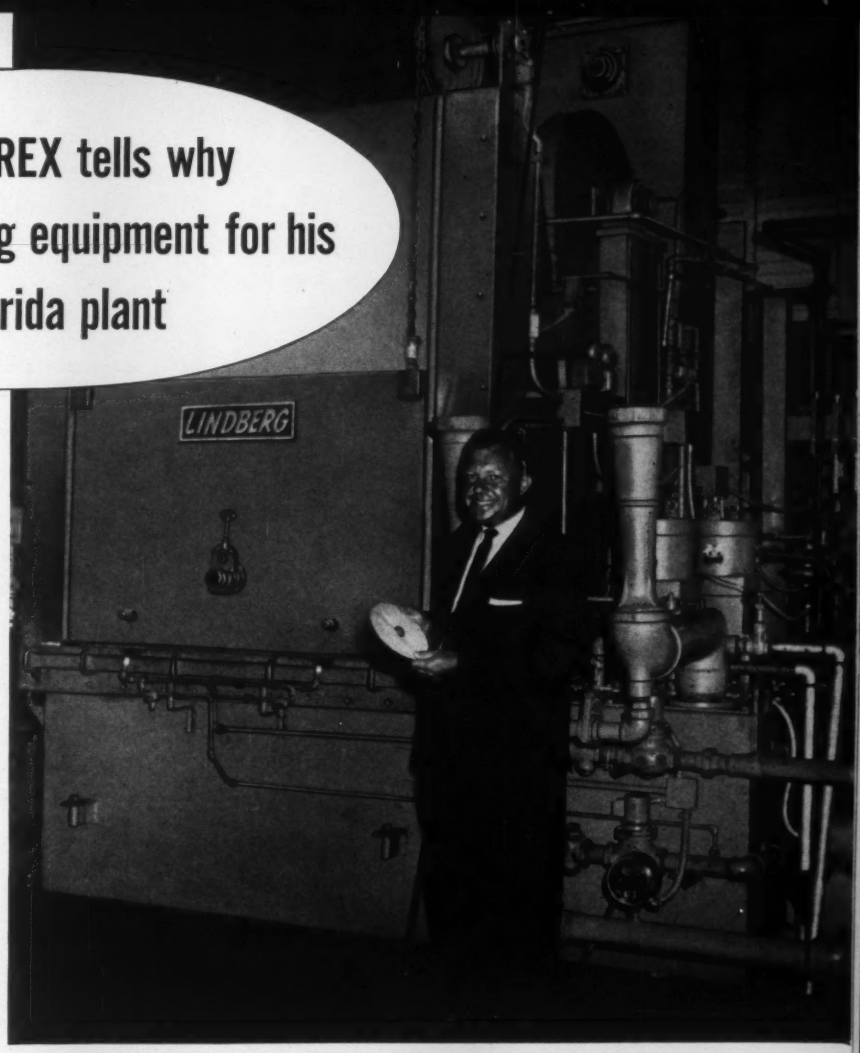
DIVISION OF
COPPER RANGE COMPANY

MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY

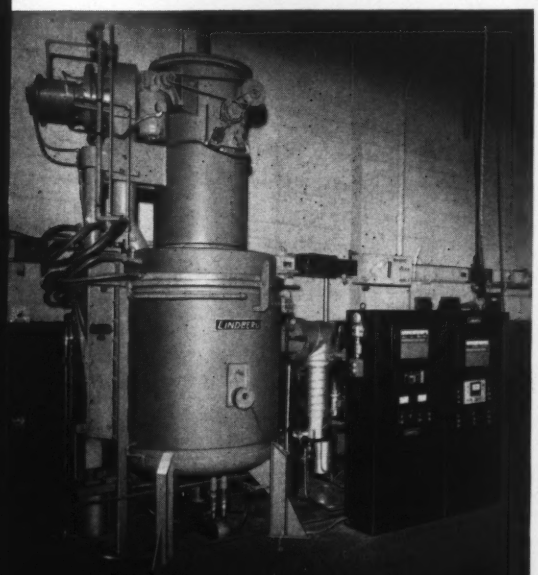
J. WALTER REX tells why he chose Lindberg equipment for his new Florida plant

QUOTE from Mr. Rex

"When we designed our new plant, Rex of Florida, Inc., we made sure we could provide the Florida metal working industry with complete heat treating services. After carefully surveying the industrial activities we would serve we knew we would be called upon to offer scientifically controlled, high quality heat treating for a variety of metals, both ferrous and non-ferrous, and an unusual diversity of sizes, shapes and weights. Our long experience with Lindberg furnaces and atmosphere controls assured us that we could depend on Lindberg equipment to help us meet most efficiently the widely varying demands of our Florida customers."



J. Walter Rex, President, Rex of Florida, Inc., Fort Lauderdale, with Lindberg high temperature, all-purpose furnace, one of six Lindberg units specified for this new plant. Mr. Rex, also President, J. W. Rex Company, Lansdale, Penna., is recognized as one of the foremost metal working authorities and his commercial heat treating operations are among the largest and most important in the country, particularly in treating components for rockets and missiles.



Latest Rex purchase from Lindberg—new vacuum furnace for Lansdale, Penna., plant

Mr. Rex's confidence in the ability of Lindberg equipment to meet the most exacting commercial heat treating requirements is based on the years of efficient and dependable service rendered by Lindberg units in his commercial heat treating operations. He has been a Lindberg customer for nearly 20 years. We're glad that he has found our equipment so satisfactory. We're very well satisfied with Mr. Rex as a customer, too. Altogether, including the units for Rex of Florida, Inc., he has purchased 34 Lindberg units over the years.

Lindberg offers the most complete line of fuel-fired and electric furnaces and equipment for heat treating ferrous and non-ferrous metals available to industry. If you have any problem in heat treating, get your local Lindberg representative's help now. You can depend on his experience and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. And it's easy, too! Just call your Lindberg Field Engineer (he's listed in your classified phone book) or write us direct. Heat Treating Furnace Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

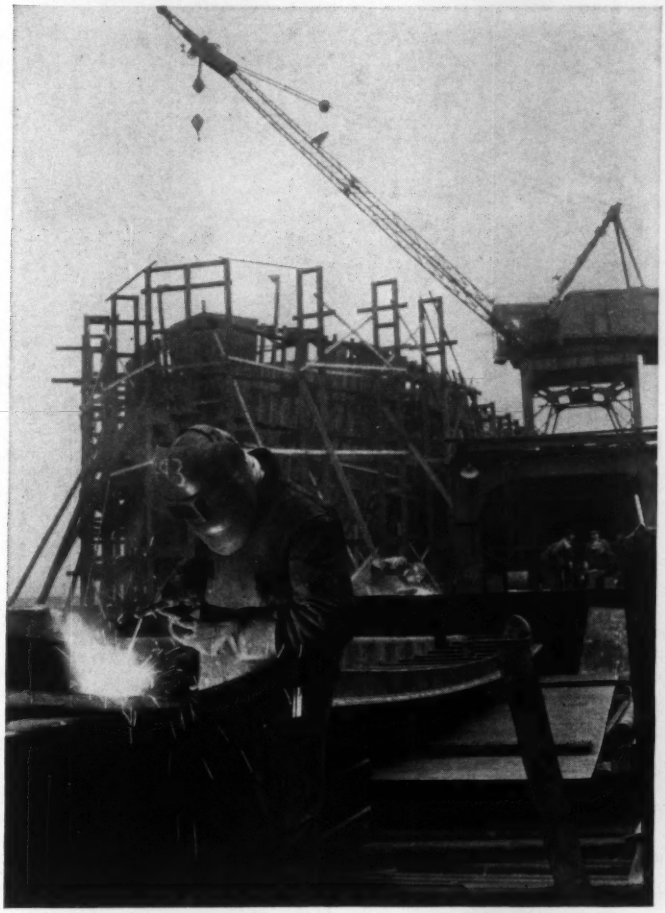
Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, Spain, Switzerland and West Germany.

LINDBERG
heat for industry

Solve any manual welding problem with ▸▸▸
. . . welders that have the greatest operator appeal—Lincoln **Idealarcs.** Men work better with these machines simply because they like them better.

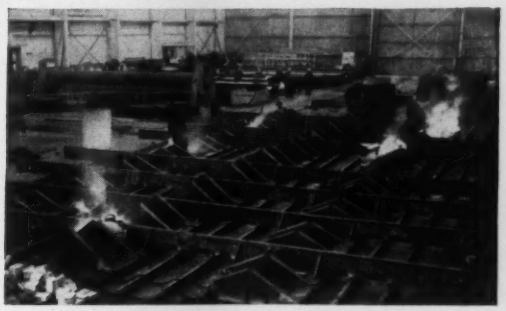
▸▸▸LINCOLN IDEALARC WELDERS

TM, R3M and TIG are the designations for the families of Lincoln heavy-duty Idealarc welders. R3M uses DC electrodes only; the TM, both AC and DC electrodes; and the TIG, either type electrode plus the inert gas process. One or more of these machines will handle every conceivable manual welding task, and, at the same time, permit your operations to stay flexible to meet future market conditions or accommodate newly developed electrodes. And do it profitably!



Shipyard work has flat fabrication where high-speed AC electrodes are best—and vertical and overhead welding when DC is preferred. *Idealarc TM's* are available in two models—straight AC, and AC/DC. The latter was used here since with it, you can change from one current to the other just by flipping a switch . . . that fast. This kind of flexibility lets you stay competitive as demand for high speeds and top electrode performance increases.

While stick welding makes up the bulk of most shop work, there is a growing use of stainless steels, aluminum, magnesium and other non-ferrous metals which are welded with an inert gas shield. Lincoln's *Idealarc TIG* welder provides both AC and DC currents plus high frequency, gas and water controls for the Tungsten Inert Gas process. It is the most complete, most versatile machine made for manual welding, and thus is ideal for large job shops.



Structural and heavy equipment fabricators feel that low machine cost plus reliability are the keys to profits on long-run, repetitive production work such as this. *Idealarc TM's* were chosen here since they are the lowest cost, straight AC welder made. And they have proved dependable through years of hard service. Get facts about Idealarcs from your Lincoln field engineer . . . a specialist in welding. Or write for bulletins which describe each machine in detail.

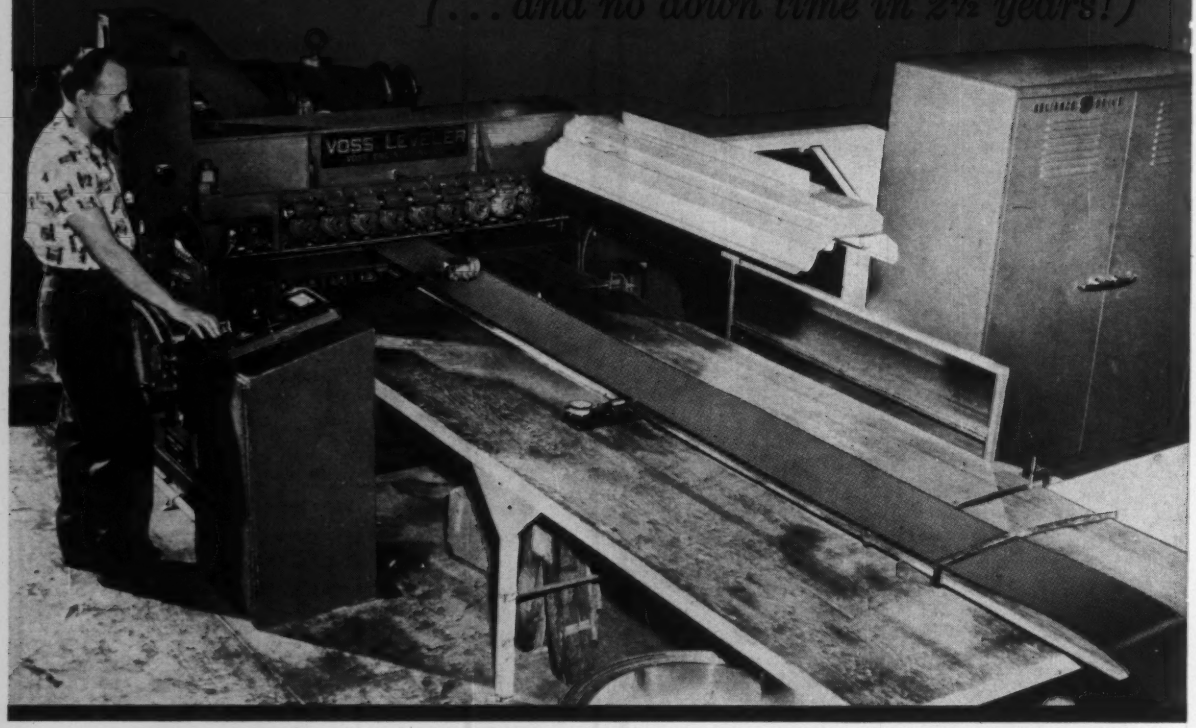
THE LINCOLN ELECTRIC COMPANY • DEPT. 1941 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES

DEAD FLAT ALUMINUM STRIP... UP TO 150,000 POUNDS DAILY— ON VOSS ROLLER LEVELERS

(. . . and no down time in 2½ years!)



One of two Voss Levelers in operation at the Lancaster, Pa., plant of Quaker State Metals Co.

Ask Quaker State Metals Company, a leading supplier of aluminum to siding manufacturers. Quaker State puts *all* their aluminum siding stock through Voss Levelers, because *only Voss gives them the absolute flatness their customers demand.*

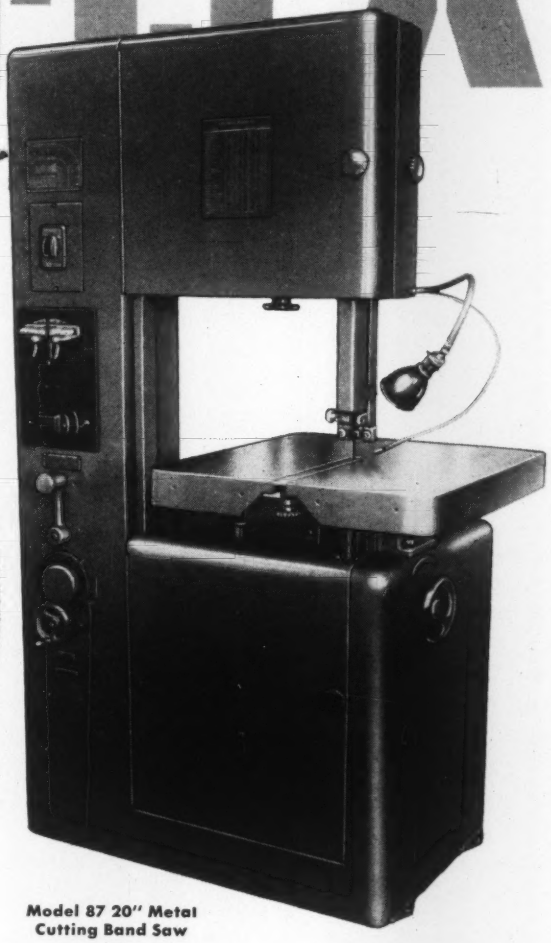
Quaker State's first Voss Leveler was installed 2½ years ago, the second one a year later. Both have withstood long periods of 24-hour operation, leveling up to 75,000 lbs. per machine daily . . . with no downtime since installation!

Voss Levelers will solve almost any leveling problem . . . *at high production speeds.* Patented features make possible accuracy and flatness unheard of with any other leveler, *equalling or exceeding stretcher-level flatness in* many cases. Voss Levelers are now in use in steel, aluminum and other non-ferrous plants, in applications ranging from heavy plate to cold-rolled strip, galvanizing lines, aluminum sheets and many others. Let Voss put its years of experience to work for you. Call or Write today.

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

FLEXIBLE



Model 87 20" Metal Cutting Band Saw

- Heavy-duty 6" Trunnion
- Front-mounted Control Center
- Convenient Blade Welder and Grinder
- Flat or Ball-bearing Guides
- Complete accessories available

DIAL YOUR SPEED AND CUT YOUR COST . . . SAFELY

Set your speed from 40 to 4600 SFM instantly . . . while machine is running!

See how much you save in speed change-over time as you switch from one stock to another instantly . . . ferrous and non-ferrous metals, wood, plastic and similar materials.

Extra safe, too . . . completely guarded except cutting edge . . . guide arm is counter-balanced.

Model 1200 20" Drill Press

VARIABLE OR STEP-PULLY MODELS

15" or 20" models in single units or multiple arrangements for every job requirement. Famous Powermatic precision, safety and dependability for years of rugged service.

Dealers in Principal Cities

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MACHINE COMPANY Dept. 6

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BAND SAWS DRILL PRESSES GRINDERS

AND FAMOUS WOODWORKING MACHINES

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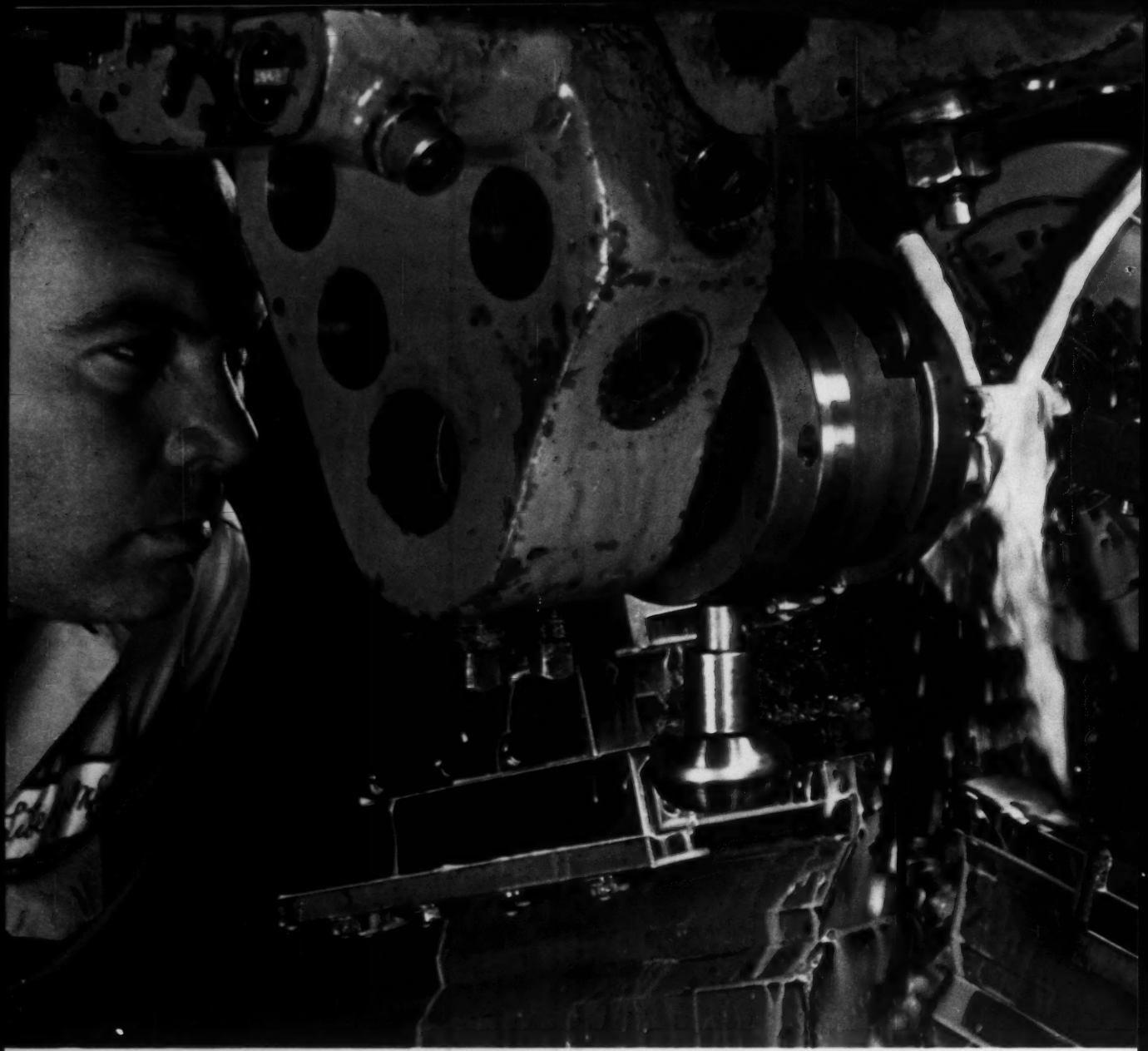


Thread rolling a sucker rod. The coolant: Gulfcut Heavy Duty Soluble Oil. It helps Liberty produce an unusually fine thread.

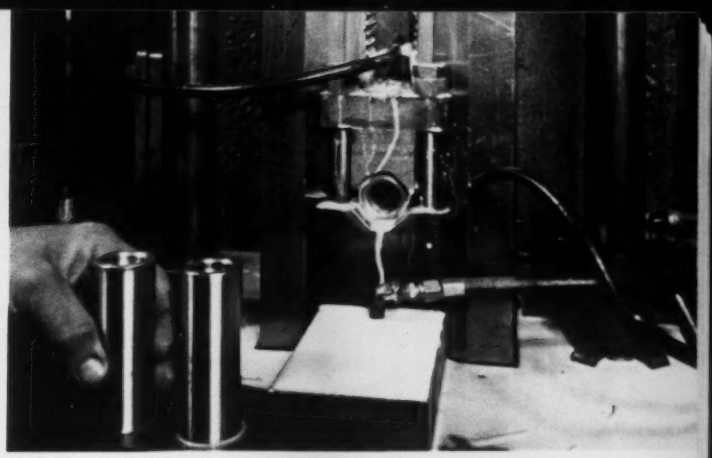
Change to Gulfcut® Heavy Duty Soluble saves thousands of dollars yearly...

Liberty Manufacturing Company has a certain distinction in the oil industry. This Fort Worth, Texas, firm was the first to market ½-inch sucker rods—used in oil wells to actuate the pumps which bring oil to the surface.

Some months ago, the company switched from a chemical coolant to Gulfcut® Heavy Duty Soluble Oil—and eliminated a costly degreasing operation. Previously, degreasing was necessary before sucker rods could receive a coat of protective paint.

"We use a ratio of 20 parts water to one part oil," says Mr. W. V. Barbee, Plant Superintendent. "The result: a light film of oil. It protects the rods against rust, yet isn't heavy enough to make us degrease before painting.

"We've benefited in other ways from the change-over. For instance, we haven't found one bit of rust in any machine-operated part. Paint peeling is no longer



Slotting a 5/8" couplet which fits on the end of a sucker rod. Gulfcut Heavy Duty Soluble Oil is the coolant.

W. V. Barbee, left, Plant Superintendent, and Frank Mauro, Gulf Sales Engineer. In background is stack of sucker rods.

Oil eliminates degreasing operation, GULF MAKES THINGS RUN BETTER!

a problem. And tool life seems to be much improved.

"Lastly, poorly rolled threads on sucker rod pins can lead to real trouble—broken joints out in the oilfields. But Gulfcut Heavy Duty Soluble Oil helps us get an almost perfect thread."

If you've got a tough machining problem, give us the opportunity to show you how Gulf makes things run better! Call a Gulf Sales Engineer at your nearest Gulf office. Or write for Gulfcut literature.

GULF OIL CORPORATION
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Houston 2, Texas

GULF

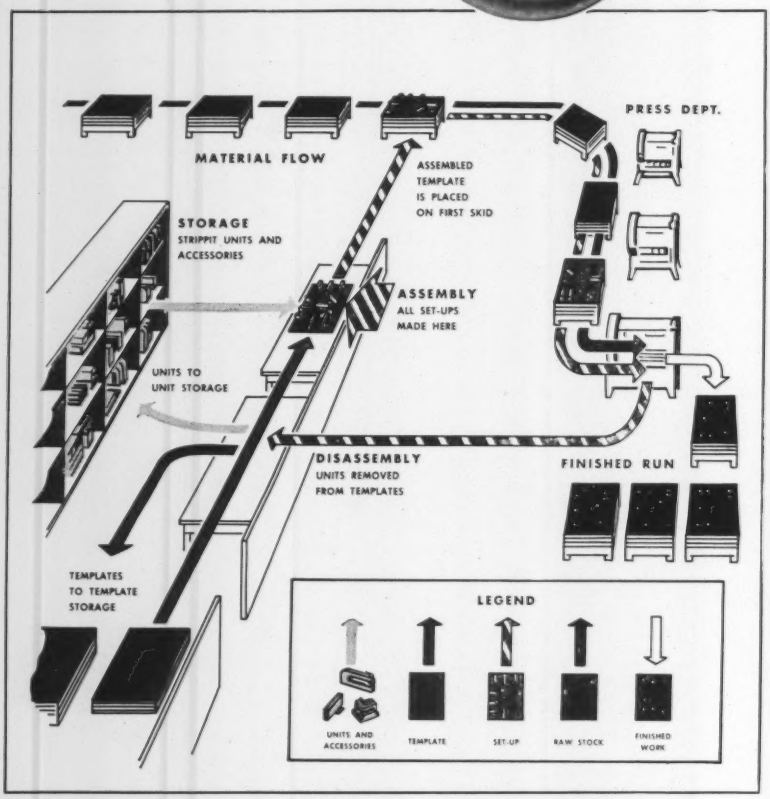
BEAT THE WATCH

with time-saving STRIPPIT hole punching units

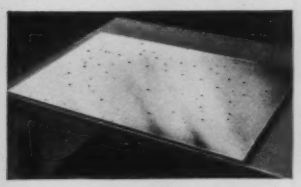
A stop-watch measures *dollars and cents* when it measures the time you spend setting up tooling. But the STRIPPIT System reduces hours to minutes and seconds . . . releases high bracket tool designers, die makers and die setters for work on more complicated dies involving forming, drawing and other operations.

All it takes is a good mechanic to make STRIPPIT setups on bedrails, T-slotted plates or drilled templates. The latter are particularly valuable in saving press down time because the complete setup can be inserted as soon as the previous press run is finished.

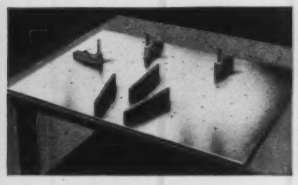
STRIPPIT self-contained hole punching units come in a multitude of sizes and capacities to meet any pattern requirement. Newest of these are the "BN" and "CJ" series which can be used for punching round or shaped holes. Also available are notching units and units for punching angles and extrusions. Write now for the STRIPPIT General Catalog.



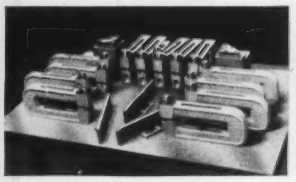
Typical STRIPPIT setup takes only 25.33 minutes from work order to finished piece



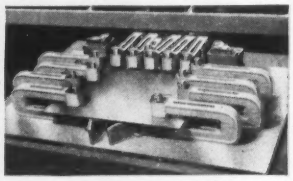
The STRIPPIT System begins with examining the blueprint, selecting the pre-drilled template and placing on setup table.



Feed rails and work stops are mounted securely to the template according to the size and the shape of the blank.



Notching units and hole punching units are mounted. Pilot pins concentric with punch assure precise positioning.



Complete setup is inserted in press and bolted down, shut height is adjusted and first piece punched and checked.

WALES **STRIPPIT** INC.

202 Buell Road • Akron, New York

A UNIT OF HOUDAILLE INDUSTRIES, INC.

In Canada: Strippit Tool & Machine Company, Brampton, Ontario
In Continental Europe: Raskin, S. A., Lausanne, Switzerland *In the British Isles: E. H. Jones (Machine Tools) Ltd., Hove, Sussex, England*

46 x 90-inch Universal Slabbing Mill.

BLAW-KNOX SLABBING-BLOOMING MILLS

Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in universal and high lift types. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals. Sheet and strip processing equipment. • Electrolytic tinning, annealing, and galvanizing lines. • Seamless pipe and tube mills. • Draw benches, and cold draw equipment. • Blaw-Knox Medart cold finishing equipment. • Iron, alloy iron and steel rolls. • Carbon and alloy steel castings. • Fabricated steel plate or cast-weld design weldments. • Steel plant equipment. • Heat and corrosion resisting alloy castings. • Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pa.

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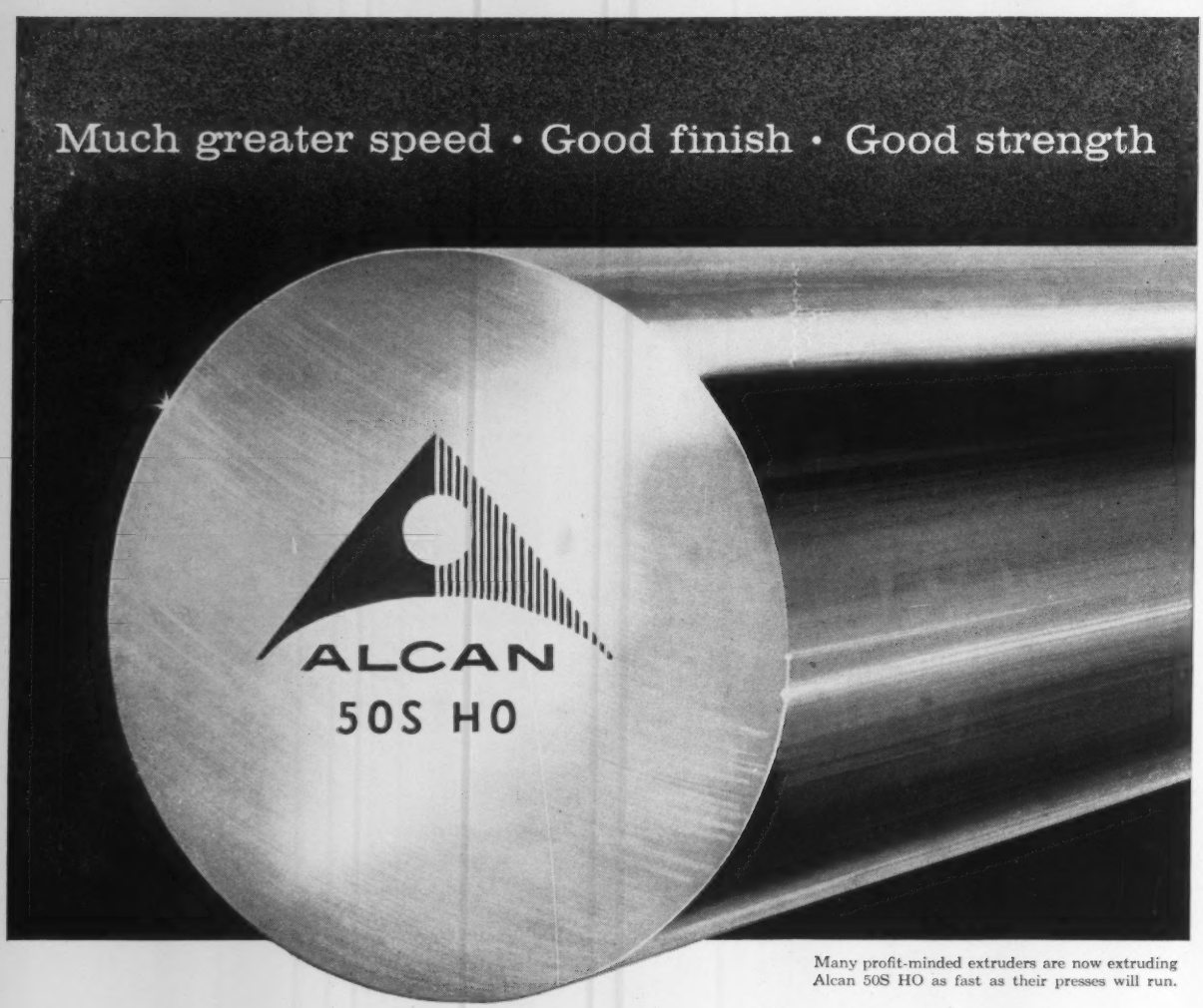
Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves



Many profit-minded extruders are now extruding Alcan 50S HO as fast as their presses will run.

Here in one aluminum ingot...

much greater extrusion speed... plus good finish and strength

WHEN you run Alcan 50S HO you get greater production . . . per day and per machine-hour . . . while still maintaining good mechanical properties and finish.

That sums up the experience of many fabricators now using this much-improved version of the long-time favorite Alcan 50S. They're unanimously enthused about its increased press speed . . . *up to maximum press capacity.*

Because of the all-around performance of Alcan 50S HO, there is no longer any necessity for stocking a large variety of ingot products. This one ingot takes care of the majority of product runs. Alcan 50S HO Ingot can reduce your inventory as much as 60%.

Alcan of course supplies other types of extrusion ingot to meet special job requirements.

Run 50S HO on your own equipment . . . and clock your production on the run-out table.

For further information on Alcan 50S HO, write or phone your nearest Aluminium Limited Sales Office.

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ALCAN

Metalworking Newsfront 6

STEEL MILLS ARE FACING FURNACE REPLACEMENT DECISIONS as a result of smog crackdowns. Mills are reluctant to put costly equipment on units that may be retired in a few years. And they would like technical and market outlooks nailed down better before going ahead with oxygen vessels and other major programs. Civic pressure may force oxygen vessel decisions.

STEPPED-UP DEMAND FOR SPECIAL PURPOSE MACHINE TOOLS is predicted for the second half of the year in a survey of members of the American Machine Tool Distributors' Assn. Some 33 pct see this class of tool in greatest demand. Association officals state this is a very high rating compared to past surveys. The 41 pct picking general purpose tools is lower than usual.

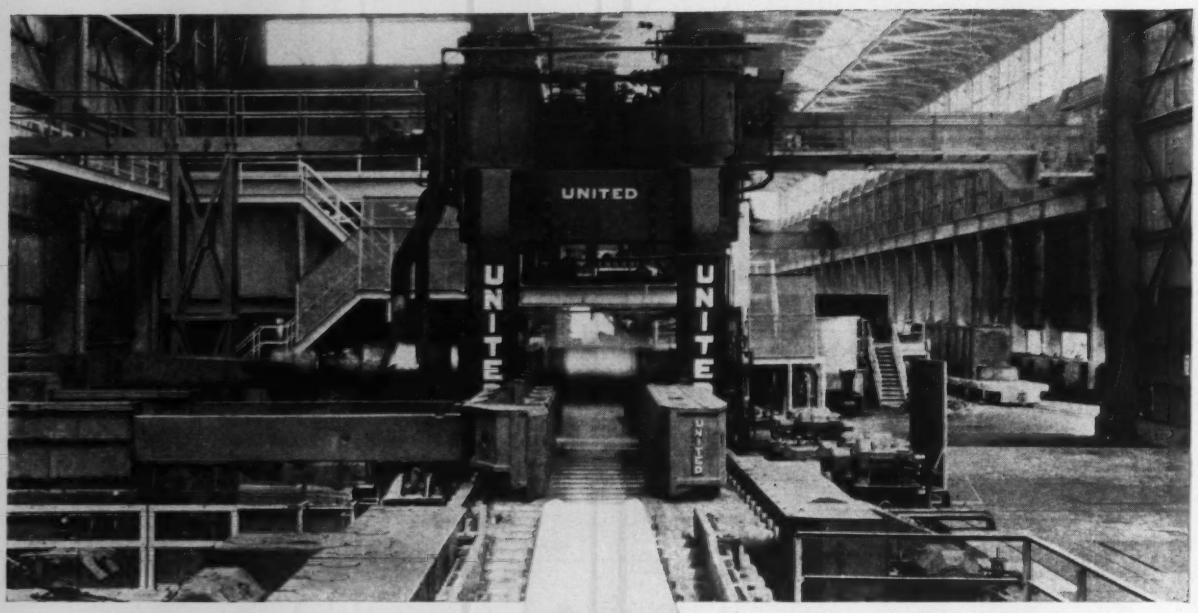
PURCHASING EXECUTIVES ARE EXPECTED to swing to inventory accumulation buying during the last half of the year. This is a conclusion of Dr. J. H. Hoagland, economic consultant to the National Assn. of Purchasing Agents. He points to three forces that will spur this buying: Strike "protection" buying, price increase hedging and lengthening vendor delivery times.

NEW ORDERS FOR MATERIAL HANDLING EQUIPMENT jumped 27 points in May in the index of the Material Handling Institute. The index, which measures dollar volume of orders received by producers, hit 136.47 (1954=100). The 1960 average was 122.55. Further hikes are expected, but not as great as the one scored in May.

THE MARKET OUTLOOK FOR FARM EQUIPMENT has grown shaky in recent weeks as a result of drought conditions in major selling areas. But export sales are being pushed and are showing strong gains.

AN ALL-TIME HIGH IN CONSTRUCTION volume in 1961 is predicted by Associated General Contractors of America. The group forecasts a $57 billion total for the year. This is slightly over the 1959 high of $56.2 billion.

AT LEAST ONE MAJOR U. S. METALWORKER is conducting major research aimed at optimum use of tape-controlled machines. The study is aimed at cutting labor costs and will encourage tape control in all manufacturing areas in which it proves feasible. The company, a producer of a varied line of heavy mobile equipment, is already requesting bids for tape run equipment.



Granite City slabbing mill rolls over four million ingot tons without loss of a single bearing

. . . thanks to dependable FARVAL DUALINE CENTRALIZED LUBRICATION

Here's what the record book shows: Over a 4½-year period, this modern rolling facility at Granite City Steel Company delivered 4,420,000 ingot tons—*and not a single bearing failed due to lack of lubrication!*

That's because 19 Farval systems—both manual and automatic—kept an around-the-clock watch on 940 points of lubrication to help maintain production at high levels. No measuring valves were taken apart, cleaned or repaired. As a matter of fact, no money was spent for maintenance of the Farval systems during this record 54-month period.

You'll generally find Farval on the job wherever steel is made or worked. Literally thousands of systems are daily protecting bearing life of rolling mill machinery. Many such Farval systems have chalked up service records of 20 to 25 years . . . and still going strong.

Find out how Farval can help reduce bearing wear on all types of industrial machines and equipment. Write for our latest literature which gives the complete Farval story, or contact your local Farval representative.

Three of 7 heavy-duty automatic, time clock controlled Farval Central Stations that serve Granite City Steel's Slabbing Mill

Farval Division
Eaton Manufacturing Company
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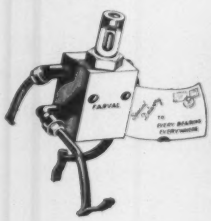
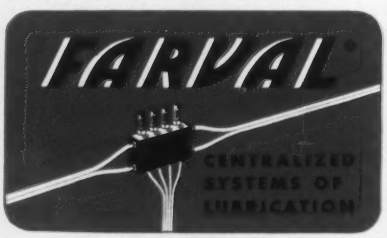


Farval Studies in Centralized Lubrication No. 256



UAW Bids for Worker "Security" In New Auto Contract Talks

The recession made UAW members more security-conscious. So they are asking for more protection from fluctuations in the economy.

But some of the union's proposals would invade industry's right to manage. These could stall a peaceful settlement.
By H. R. Neal

■ The latest round of auto contract talks opened just before the July 4 holiday. In the three weeks since then they have followed more strange roads than vacationers lost in the hill country. And the union's strategy has left most of the auto industry just as uncertain of where they are going.

This year the UAW strategy has been overhauled drastically. It has presented the companies with a raft of "pressing human problems" (see box); it has "suggested" solutions. But it does not call them demands. And Mr. Reuther insists the union will be "flexible" in working out the solutions, but is "inflexible" in its insistence for solutions.

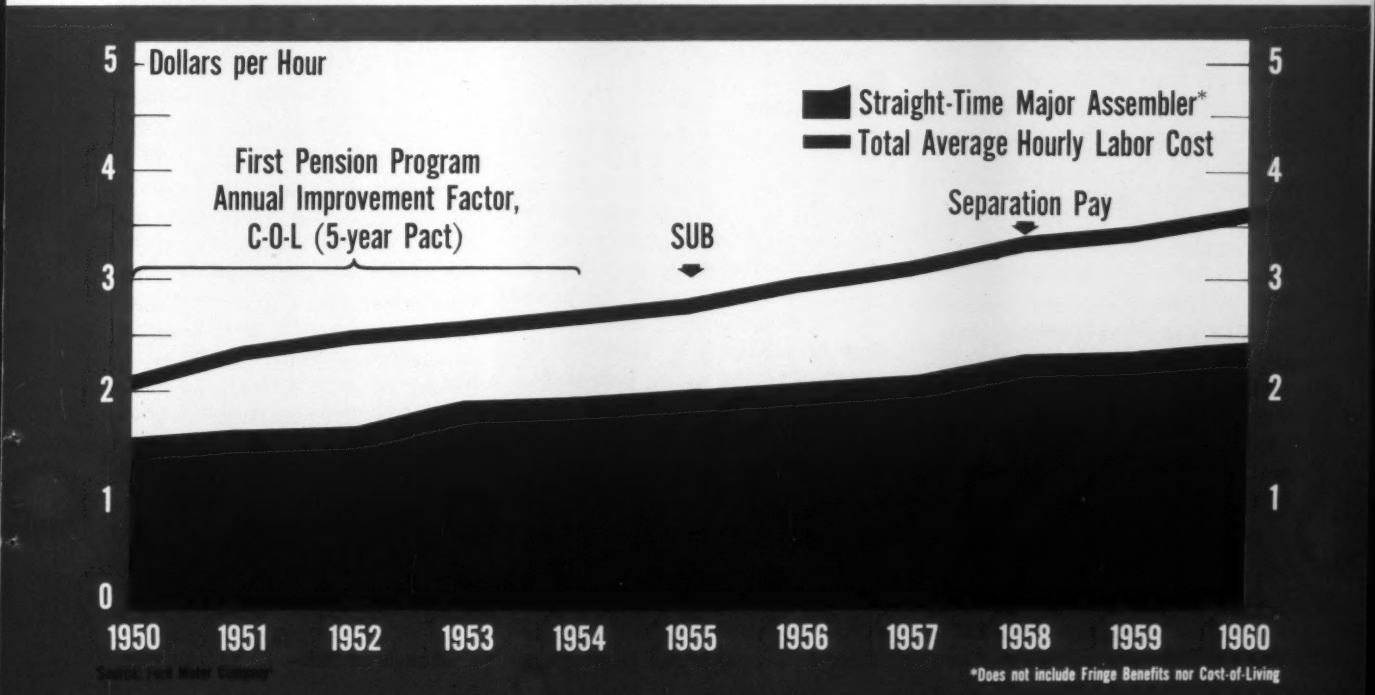
Security Problems — Actually, there is nothing startling new in the union's program. One auto executive says it contains "everything Walter ever asked for and didn't get—and everything he ever hopes to ask for."

But the outcome could have broad repercussions throughout industry: It will determine whether many of the union's objectives are rightfully subject to collective bargaining.

Broadly, what Mr. Reuther and the union refer to as "pressing human problems" affect job security of employees. They also affect management's "right to manage" in many instances. To the companies, this is as important—and potentially costly—as the usual economic issues.

Impatient Listeners—At GM and

History of Auto Wage and Labor Cost Increases



"everything Walter ever asked for . . . and . . . hopes to ask for."

Ford, the union doled out lengthy, but non-specific, "position papers" a few at a time, didn't finish the presentation until July 14.

But impatience and frustration began to show early. Mid-way through the two-week presentation, Louis G. Seaton, GM's vice president-personnel, commented, "I have no quarrel with the way the UAW wants to use its turn at bat but, frankly, we may be wasting a little time.

"It's essential to collective bargaining to understand just as early as possible what the areas of disagreement are so that we at least know what we're arguing about."

Parallel Bargaining—Possible insight into some of the purpose behind the UAW's tactics might be found in the quick retort from Leonard Woodcock, UAW vice president and director of the union's GM Dept. "In 1958, we sat around here from the end of March to mid-September before we got a wiggle out of management on a new contract."

Chrysler received the whole bundle of problems two days in advance of the day it opened talks with the union on June 30. But it withheld comment, waiting for Ford and GM to take the initiative. This is a continuation of the "parallel bargaining" first employed in 1958.

The "parallel bargaining" concept established during 1958 contract talks is as close to industry-wide bargaining as the automakers want to come—at least right now. But there is no lack of communications between them. When the time comes, General Motors, Ford, and Chrysler will follow the same general attack and put up virtually identical arguments.

For the Defense — Here's how some of them will go:

On employment, GM has already pointed out that it now has 335,000 hourly-rated workers on its rolls, compared with 268,000 in 1947. The peak was 410,000 in 1955. But GM says huge sales explain the 1955, and the company had 36,000 employees on defense work compared with 8800 this year. Ford's employment has been steady at around 166,000 since 1959, and only slightly below the 1950-60 average of about 168,000. At Chrysler, however, about 50 pct of the company's 90,000 hourly workers are laid off.

Hours and Salary — Reduced working time, at least in the form of fewer hours per day or days per week, will be dismissed as "just another way to get us to start paying overtime sooner." Union officials have privately admitted it would do little to aid employment. Neither would more holidays. And scheduling of overtime gets into "management's rights."

Arguments against a salary for blue-collar workers will be based on the fact that the need for office workers fluctuates little in comparison with production jobs. Even when demand for cars is down, the paperwork goes on—and much of it increases, as in the case of administering SUB payments and other fringe benefits.

Battle Over Insurance—Raising Supplemental Unemployment Benefits and extending the length of time they would be paid could make it more attractive to be idle than to work. But some change will probably be made in this direction. The union considers it a "must" as a step toward the salary system and the old goal of a guaranteed annual wage.

Full payment of health insurance benefits is a sleeper. Other industries have it. But automakers will resist strongly. First, it would cost 7¢ to 10¢ an hour for workers in the Detroit area. Second, the companies consider worker and union resistance to ever-climbing Blue Cross-Blue Shield costs important to holding costs down. If the companies pay all, employees will no longer care how much it costs. GM says it would cost the company $58 million per year, double what it now pays. However, a compromise is possible.

High Cost-of-Living — Annual Improvement Factor and Cost-of-Living adjustments have grown to 64¢ and 54¢ per hour respectively since 1948. The union has considered these features to be "in the bag" when negotiations start and scale demands upward from there.

Now, the companies say it's out and will have to be renegotiated into contracts or given up for something else. There is a good chance that fringe benefits will eat up at least part of the cost of these items, reducing or eliminating them altogether.

Ladder of Success—With all of this, another complication has been added. American Motors Corp. was elevated to the ranks of the "Big Four" by Mr. Reuther at the opening of its talks. Up-grading is based on AMC's improved earnings showing since 1958.

The union chief noted that AMC received concessions both in 1955 and 1958 which enabled it to show a better return on investment in 1960 than that shown by even GM.

However, AMC vice president Edward L. Cushman side-stepped the opportunity to join the other companies in "parallel" bargaining.

"New Approach" — Instead, he proposed a "fresh, new approach" to collective bargaining. And it has suddenly become possible that the "independent" automaker will settle before the Big Three. While it would not necessarily set the pattern for the industry, it would put some restrictions on negotiations still in progress.

AMC still hasn't spelled out its proposal in detail. This will probably come when national contract negotiations resume on July 26. But these three elements have been outlined:

Rough Sketch—1. A continuing

Do These Spell Security or Strike?

The United Auto Workers' Union has unwrapped upwards of thirty elements at auto industry bargaining tables. They make up the union's "flexible" approach toward the "pressing human problems" which confront the union and its members.

Here are the areas that form the core of this year's negotiations:

Reduced Working Time—The union wants to create more jobs by reducing the number of hours worked. Some proposals: Fewer hours per day; fewer days per week; longer vacations; more paid holidays; industrial sabbaticals, a whole year off with pay; earlier retirement; restriction on overtime.

Blue-Collar Salaries—Hourly-rated workers would ultimately be paid salaries. Union suggests starting with technicians to establish the principle, apply it to others over the life of the contract.

Displaced Workers—Workers whose jobs are eliminated or moved would be relocated at company expense or would receive greater severance benefits. Also, the union wants a vote in decisions affecting plant closings and the shifting of work.

Early Retirements—Workers would be allowed to retire after reaching 60 at higher pensions. This would open jobs for younger workers.

Insurance Benefits—Companies are asked to assume the total cost of medical-hospitalization-surgical insurance covering employees and their families.

Sub—Raise benefits to 65 pct of gross weekly pay instead of 65 pct of net; remove ceiling limitation of $30. End short workweeks and install full-week layoffs which would then permit SUB payments.

Wages—Raise wages to compensate for technological improvements and to boost purchasing power. The "annual improvement factor" and cost-of-living adjustments are considered as minimums.

Production Standards—Establish production standards based on the specific operation for each plant rather than a common standard for all plants. End speedups after a standard is established.

Subcontracting—This would bar work by outside contractors where the work could be performed by plant employees.

Length of Contract—Union wants a two-year limit on contracts containing provisions for improvement factor and cost-of-living raises; one year for those without these provisions.

American Motors-UAW Conference is proposed. It would meet "solely for the purpose of studying common problems affecting the employment relationship and for effective communication between the leadership of the corporation and of the union."

2. Contract agreements would emphasize "career employment planning." It would embody training workers to "meet changes resulting from increased automation and technological advance as an approach to maximum realization of employee opportunity."

3. The company proposes to recognize its unions "beyond the life of individual contracts." This is designed to assure employees and the union that the company isn't going to move elsewhere just to rid itself of the union.

Uneasy Period—The Big Three tends to play down AMC's proposals with such comments as, "What are they doing? Just saying they'll recognize the union." But they are a bit uneasy as to what AMC might negotiate in the way of a new contract—especially if it settles first.

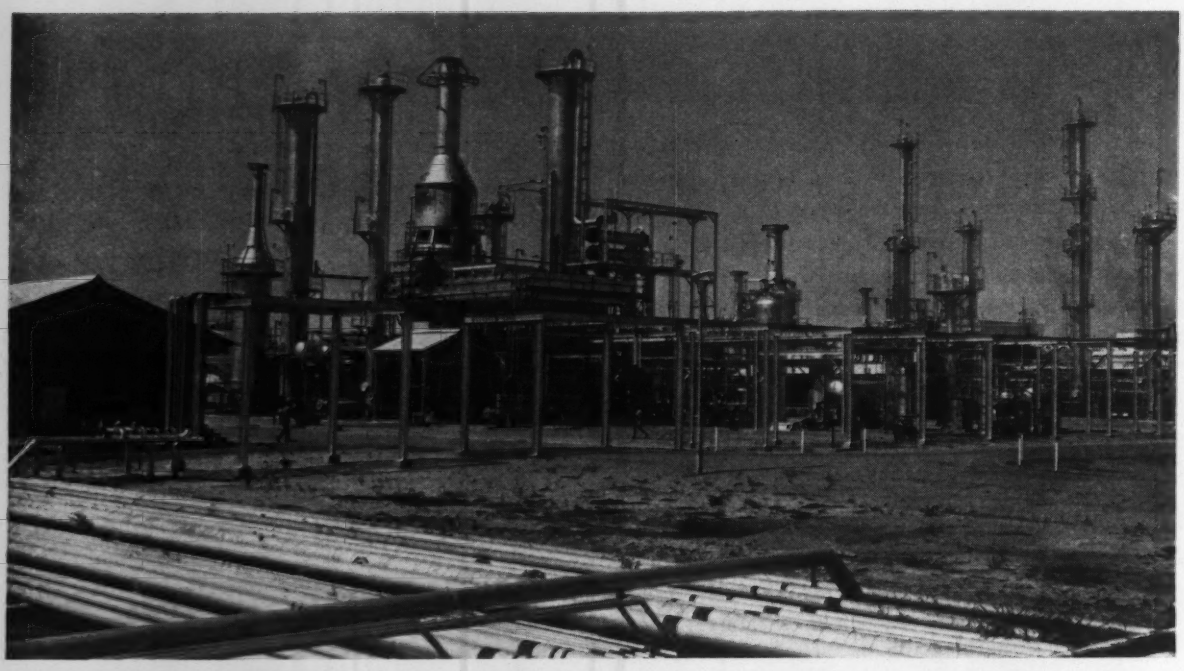
Membership Dwindles — The UAW membership is eroding away —and fast. And the UAW intends to get some help from the auto industry in holding itself together.

Part of the drop is due to lower employment in auto manufacturing. Some of this can be accounted for by improved technology, some by lower annual output. But some of it is also due to the disappearance of several auto companies and many suppliers. Also, some companies have moved plants to the South where they aren't unionized.

Workers Are Worried—So far, it would seem that there is little that would draw total support for a strike. But workers have been made "security conscious." And, while little has been said about it, Mr. Reuther has a $40 million strike fund to back up his demands. In 1958 it was only $25 million.

If a contract seems near, but isn't signed, by Aug. 31, the union could pull a short strike to add urgency to negotiations.

However, if the parties are still far apart the strike call could be delayed by several weeks. This would make it closer to the new-model build-up and the introduction date for the new cars.



COMPLETED PROJECT: Overseas industrial building is gaining. This refinery was built by Procon, Inc.

More Foreign Plants Go Up

American engineers with projects overseas say industrial building is gaining abroad.

Almost 25 pct of the equipment for these projects is purchased in the United States.

■ The foreign building outlook plays a role of increasing significance in exports of U. S.-made capital equipment.

When American engineers contract to build large overseas projects—highways and steel mills, for example—the chances are good that it will result in equipment purchases in this country. This is especially true when loans for the projects come from the Export-Import Bank or some other U. S. agency.

Even if capital originates abroad and the U. S. contractor teams with a foreign fabricating partner, as is often the case, possibly 25 pct of the total capital equipment will come from the U. S.

Industrial Gains — Total foreign work by American construction companies reached $500 million last year. But new contract awards dropped 16 pct from 1959. However, the industrial segment of foreign construction is gaining at an annual rate of nearly seven pct. And this is the area that returns business to the U. S.

C. B. Whyte, president, Procon, Inc., expects industrial installations with U. S. engineering abroad to show an equal gain this year. While estimates vary widely, it's probable that one-third of all foreign building contracted by American engineers will be for industrial plant and processing installations.

H. C. Boschen, president, Raymond International, Inc., points to a survey of 17 major companies in this field that shows they've done $2.4 billion in foreign construction between 1956 and 1960. Of that sum, about $1 billion returned to the U. S. with orders for equipment and materials.

Tax Problems—A worry to many U. S. builders in overseas markets is the proposed tax on foreign profits. If this is enacted, they say, it will hit at a time when bids are being cut to meet a massive gain in foreign competition.

The custom for U. S. builders working overseas is to form temporary partnerships with foreign engineers or fabricators.

Cut Capital—Annual taxing of foreign profits of U. S. companies or engineers would, of course, cut the working capital available in these partnerships.

If American builders can bypass the tax problem, it will be a real victory. But it's only one battle in a tough campaign. Mr. Boschen told The IRON AGE: "It wouldn't surprise me if the total foreign construction work done (by U. S. contractors) continued to fall. It's dangerous to paint too optimistic a picture of this building outlook."

Speedup Revamps Order System

Advanced Westinghouse Setup Streamlines Shipping

Westinghouse Electric Corp. is now using an advanced order processing system.

With streamlined order flow, it could bring a new approach to the job of field distribution.

■ New order processing speeds may soon bring a new approach to field distribution.

This possibility was indicated last week when an advanced processing system was unveiled by Westinghouse Electric Corp.

Serving the apparatus group, the new system uses electronic management and teletype speed. It streamlines order flow for a network of 90 sales offices, 26 field warehouses and 19 plants.

Faster Service—Immediate effect is faster order movement.

It now takes only 30 minutes from the time an order leaves any sales office to the time shipping instructions reach any warehouse or plant. Formerly it took up to five days.

Average processing cost is now about $2 an order. The old average was $18 an order.

However, the system is doing much more than simplifying paper work. According to Westinghouse officials, it is physically reshaping the distribution chain.

Changed Pattern — "Our entire warehousing pattern is changing under the impact of this new speed," says D. C. McAlister, manager, distribution accounting and procedures.

He says it is now possible to give service with less inventory. Stocks of integral horsepower motors have been cut from $5 million to $2.7 million.

Lower inventory volume and greater inventory consolidation permit reduced warehouse space.

Speed Alone—In part, says Mr. McAlister, this kind of saving is due to speed alone.

If order entry time is reduced two to four days, shipping time can be extended without affecting service. Stocks can be concentrated at fewer points. And the inefficiencies of dispersed inventories are avoided.

More important, the new system permits fast, tight management of the distribution network. All elements are plugged in by teletype to a random access computer at Pittsburgh.

Basic Role—The basic job of the computer is to get order information to the shipping point in a hurry.

When an order is received in a sales office, information is condensed to code form and teletyped to Pittsburgh. Order data comes out on paper tape. It is converted to cards and fed to the computer.

The computer has stored a complete inventory of all parts in warehouses. It consults this, picks out the closest point for the part ordered, and kicks out shipping instructions.

In addition to relaying information, the computer is working constantly to control the system. As each order is filled, it updates its inventory records.

1500 Steps—In all, the computer goes through something like 1500 steps on each order. From these, it comes up with a running picture and control of distribution.

With all this information, it has been possible to make drastic cuts in distribution costs.

With rapid order processing and precise, reliable data on warehouse stocks, the company feels it can take over a heavy part of the customer's inventory burden.

ORDER CENTER: Up to 1800 orders per day are received by the Westinghouse order processing system in Pittsburgh. Teletype machines reproduce each order on paper tape. It goes on punched cards to be read by computer.

INDUSTRIAL BRIEFS

Engineers United—American Welding Society is moving its New York headquarters to the United Engineering Center, near the United Nations Plaza, in the fall. The new Center will house 19 major engineering societies, representing a combined membership of 300,000.

Engineers Elect — C. H. Shumaker has been named to serve as president of the American Society of Mechanical Engineers. He will begin his term in June, 1962, following a mail ballot of the membership this fall.

ASTM Choices—M. N. Clair, president, Thompson & Lichtner Co., Inc., Brookline, Mass., was elected president of the American Society for Testing Materials at the 64th annual meeting. A. C. Webber, of E. I. duPont de Nemours & Co., Inc., was elected vice president.

Research Arm — Emhart Manufacturing Co. is building a new administration and research building at Bloomfield, Conn. It will allow research, development and engineering of Hartford-Empire automated glassmaking machinery.

Southern Works—Connors Steel Div., H. K. Porter Co., Inc., has opened a reinforcing bar fabricating facility at New Orleans. Fabricating and surface handling equipment are now in operation at the site.

Extra Space — Standard Transformer Co. Div., American Gage & Machine Co., has acquired 78,000 sq ft of land adjoining its Warren, O., plant. Production of low-loss power transformers will be expanded.

Trailer Takeover — Tee - Nee Trailer Co., Youngstown, has bought Ohio Industrial Trailers Div., Ohio Galvanizing Co. It will be known as the Ohio Trailer and Manufacturing Co. and will also produce liner plates and weldments for the steel industry.

Tooling Up — Winder Aircraft Corp. is completing its new facility at Dunnellon, Fla., to develop, engineer and manufacture missile-space age products. Six of 12 manufacturing buildings are now completed.

Greater Works—Zak Industries is building an additional 32,000 sq ft building for Zak Machine Works, Inc., at Green Island, N. Y. It will centralize office and engineering facilities.

Wire Expansion—National Wire Products Corp. has formed National Wire of Georgia, Inc. It will make welded wire concrete reinforcing mesh in a new leased plant at Port Wentworth, Ga.

Furnaces Added—Union Drawn Div., Republic Steel Corp., has added three new prepared atmosphere stack furnaces for coil annealing and carbon correction. One is located at Los Angeles, the other two at Hartford, Conn. They will increase availability and cut delivery time of annealed and carbon corrected products.

Merchant Mill—U. S. Steel Corp. has installed a new continuous merchant mill at its Gary Works. Built by Blaw-Knox Co., it rolls carbon and alloy steels and various merchant shapes.

Bigger Facilities — Davis Div., Giddings & Lewis Machine Tool Co., Fond du Lac, Wisc., has enlarged its heat-treating facilities. A 9 cu ft nitriding furnace has been added.

Name Change—Unigage Corp. has changed its name to Unigage Instruments Corp., Addison, Ill.

National Name—National Malleable & Steel Castings Co., Cleveland, has changed its name to National Castings Co. Operating 12 plants now, the company has changed names four times since its 1868 founding.

Space Division—Roblin - Seaway Industries, Inc., North Tonawanda, N. Y., has formed a new division, the Space Metals Div. It will make and sell high temperature alloy bars and rods for forging, forming and extruding.

New Field — Central Foundry Co., manufacturer of cast iron soil pipe and fittings, has formed a new corporation. It will build a 1000-home community in the Washington, D. C. area.

Continental Unity — Continental Can Co. will consolidate its head office staff and other offices in a new building at 633 Third Avenue, New York, this fall. The Metals Operations Group and Eastern Metal Div. will transfer to the new building, as well as other division offices now outside New York.

Larger Quarters—H. J. Ruesch Machine Co. is building a new plant at Springfield, N. J. It will increase floor space by over 25 pct for the design and development of metalworking machinery.

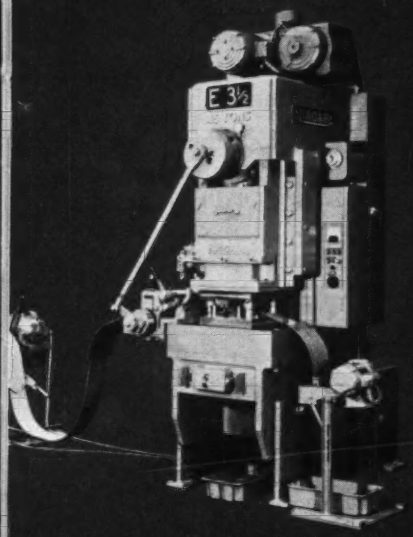
All Together — Union Carbide Corp.'s Research Institute staff has been consolidated in a new laboratory building at Eastview, N. Y. Prior to this, the Institute's activities were dispersed among four of Union Carbide's laboratories.

Plant Conversion — American Brake Shoe Co. is converting its cast iron freight car wheel plant at St. Louis to manufacture "Southern" cast steel wheels, at a cost of $2 million. The company is also spending $1 million to expand a cast steel wheel plant at Calera, Ala.

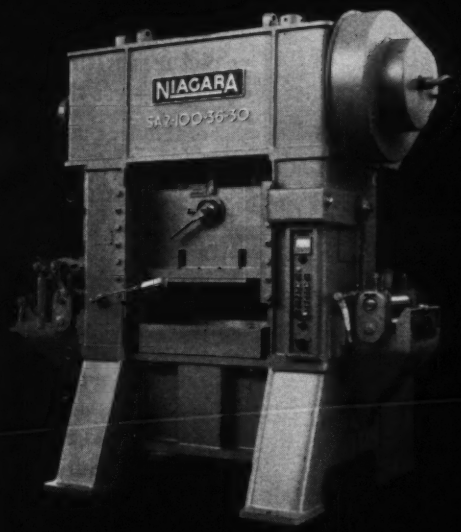
Quality Lab—La Salle Steel Co., Hammond, Ind., has completed a new centralized quality control laboratory. It contains a newly equipped metallographic lab and spark and physical testing equipment.

Powder Parts—Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has set up a new Sintered Products Div. to manufacture powder metal parts.

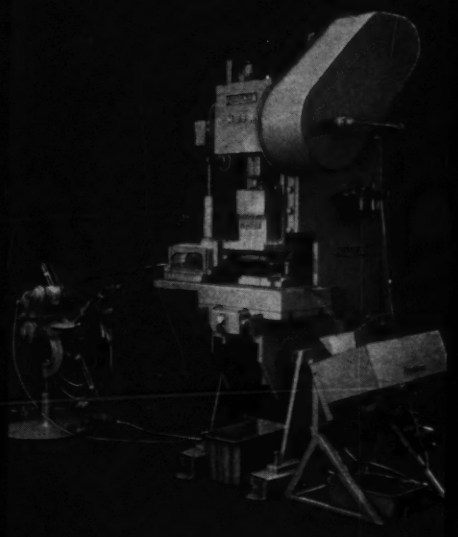
PRECISION PARTS BY THE MILLIONS



SERIES E — FRONT-TO-BACK CRANKSHAFT OBI's
Capacities: 45 to 200 tons.
45-ton model (above) stamps out fuse tips at rate of million/day.



SERIES SA-2 STRAIGHTSIDE AUTOMATICS
Capacities: 25 to 300 tons.
100-ton package (above) includes double roll feed, stock reel, scrap cutter.



SERIES M — ULTRA-HIGH SPEED OBI's
Capacities: 22 to 60 tons.
35-ton model shown operates at adjustable speeds up to 1000 spm and produces parts at rate of million/day.

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Premium construction: It's the key to premium performance here! These modern Niagara presses are designed strictly for automatic, high speed, progressive die work.

Model for model, they'll turn out more parts per hour than conventional presses of equivalent tonnage can even approach. Far heavier and more massive, they have the ruggedness, rigidity, and stamina to run vibration-free at high speeds.

Providing more guiding surface, their gibbing holds slide and bed in precise alignment for precise production, longer periods between die grinds, and longest possible die life.

But this just begins to tell the story . . .

YOU'RE INVITED TO CHECK all the features of these production-boosting machines. Illustrated Bulletins 54 (Series M), 56 (Series E), and 264 (Series SA-2), will be mailed on request. Write: Niagara Machine & Tool Works, Buffalo 11, N. Y.

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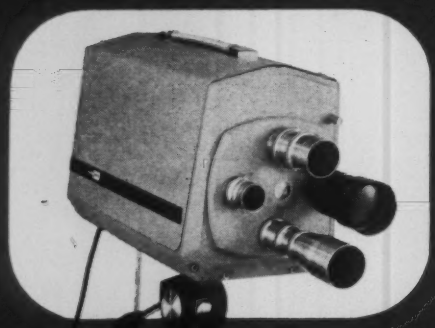

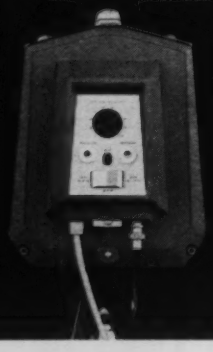

Control panel detaches from camera for remote operation via stock cable

High-quality closed circuit television is now more practical than ever. KIN TEL's new 20/20 camera is the reason. It contains its own control circuits. This eliminates the separate unit so long traditional with high-quality TV systems... lets you connect the camera directly to a monitor–or home TV receiver.

The 20/20 is easier and less expensive to install, operate, service. Yet it gives the sharpest, clearest pictures in the industry – 650 lines of horizontal resolution. It is so sensitive that you can get usable pictures with as little as one foot candle of illumination–less than the light now falling on this page.

Trouble-free operation is designed into the 20/20. Transistor circuits are used wherever possible. Power consumption is only 25 watts. Protective circuits prevent vidicon damage in case of sweep failure. And the swing-out circuit boards make servicing easy.

Many standard accessories custom-fit the 20/20 to your exact needs. A light compensation circuit automatically adjusts the camera for light variations as great as 4000:1. Motors provide remote control of the lens turret, lens focus, and a lens-speed filter. Sync generators assure 2:1 interlace either in the standard industry-wide sweep/scan pattern, or in the FINELINE pattern that gives you greatly increased vertical resolution. RF modulators make the pictures available on standard TV channels 2 through 6.

Cut costs, reduce errors with one of KIN TEL'S complete lines of high-quality, closed circuit TV. Other companies do. U.S. Steel uses KIN TEL TV to see inside open-hearth furnaces. E. F. Hutton uses one to transmit stock quotations. Los Angeles Department of Water and Power uses KIN TEL TV to check steam plant burners and to view remote water-level meters. The San Francisco Naval Shipyard uses one to guard against pilferage. American Potash & Chemical conveyor lines and warehousing operations are monitored by KIN TEL TV as are radiation studies at General Atomic. KIN TEL TV provides detailed surveillance of every type of ICBM outside the Iron Curtain. All told, hundreds of KIN TEL TV systems are performing critical and routine jobs safely, inexpensively, tirelessly.

Application help is free for the asking. At no obligation, KIN TEL field engineers will determine whether a TV system can be put to profitable use in your application. Just write direct for catalog 6-203 and the name of your closest KIN TEL representative. There is one in every major city.

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Budget Time to Manage Well

The best manager is the one who has both the time to solve problems successfully and the freedom to act.

But systems and procedures can take up time and delay action. Here are suggestions on getting things done.

■ Nothing is more basic to management than system. Yet, if not controlled, methods and procedures can get in the way of progress. They can even stop it dead in its tracks.

Stay Flexible—That's why, while tied to systems, the modern manager must stay flexible. The end as well as the means must be important to him. He must always maintain a sense of timing. While solving short-term problems, he must keep alert to long-range needs.

In all this, the manager must be on guard that procedures don't roadblock progress. Executive freedom to plan and act is becoming more and more necessary. The pace of today's business has cut down management's reaction time.

New markets develop with startling swiftness. New production methods gain fast approval and use. Competition is no longer strictly company versus company. It's now often measured in terms of industry versus industry, country versus country, trade bloc versus trade bloc.

Plan and Delegate — With the need to think and act clearly, but swiftly so important, how can the manager find the time to do it? One obvious answer is better planning of time for maximum use. Another is the developing of competent subordinates to take over the details. A third might be the hiring of long-range planners.

Most executives probably feel they make sound use of their time. But a review of how it is spent may be profitable.

Discussing this in the University of Indiana's Business Horizons, Paul J. Gordon, associate professor of management at that University, recalls one executive's complaint about his company: "The trouble with this outfit is that we are so busy mopping the floor we never get to turn off the spigot."

Review and Analyze—The technique for improving use of time requires critical questioning of everything done, says Prof. Gordon. This means inventorying present activities—getting an up-to-date picture of the sequence and categories of daily, weekly, or monthly duties.

Each activity must be questioned again and again on this basis: Is it essential? How does it rate in relative importance, priority, and sequence? Would it remain if the executive's list of activities was cut in half? Is it done because of the executive's personal interest or his superior's personal interest? Is it done simply for a change of pace after some more rigorous or more frustrating activity?

Careful Listening Is Vital

■ Learning to listen carefully is another way the busy executive can get maximum benefit from his time.

Effective listening means learning economy, increased industrial efficiency, and better professional relationships. That's the opinion of Prof. Ralph G. Nichols, director of the University of Minnesota's Department of Rhetoric.

He points out most people spend about 70 pct of their waking day in verbal communication. Just listening takes up about 45 pct of that time.

Concentrate, Concentrate—Learning to concentrate is the most important aid in good listening, Dr. Nichols notes. He then gives these tips to eliminate or minimize bad listening habits: Don't call the subject uninteresting. There are no uninteresting subjects, only uninterested listeners. Don't get overstimulated or understimulated. Withhold evaluation until comprehension is complete.

Listen Objectively—Don't listen merely for facts. Listen for the main idea. Don't fake attention. Avoid making an outline of everything you hear. Don't trip over emotion-laden words.

Concentrate on paying attention to difficult or involved passages. Don't create or tolerate distractions.

Announcing... IRON AGE METALWORKING INTERNATIONAL

A NEW and completely DIFFERENT kind of publication! NOT just another United States business magazine extending its circulation into other countries, but a truly international, multi-lingual business publication for metalworking and metal-producing executives throughout the world.

First issue: January 1962.

EDITORIAL

● **Objective:** To provide a full international exchange of information relating to new developments and technology on metalworking processes, equipment and materials, as well as coverage of business and economic news.

● **Staff:** A full-time editorial staff in the United States and abroad will devote its entire efforts to the international publication, backed up by qualified correspondents in 18 metalworking centers throughout the world.

● **Content:** Editorial content and balance will be guided by continuing surveys of informational requirements and preferences among key executives in metalworking companies in the countries served. Full text editorial material will be in English, with digests in German, French and Spanish.

● **Format:** The new monthly publication is uniquely suitable for effective presentation and convenient reference, from the English full-text to the German, French and Spanish digests. Square format with publication trim size 11 x 11¼, four column makeup, will provide a 7 x 10 editorial page plus one column for a multi-lingual digest. This format will also accommodate a 7 x 10 advertisement plus multi-lingual digest of the copy. New product items will be keyed and a reader service postcard provided for new products as well as advertising.

THE READER

In most cases, the reader of IRON AGE METALWORKING INTERNATIONAL will be the chief technical executive of the metalworking plant. Typically, he will be responsible for both engineering and production and will have a key role in major purchasing decisions. In larger plants, where work is dispersed among a greater number of executives, IRON AGE METALWORKING INTERNATIONAL's readers will be in four basic functions: administration, engineering, production and purchasing.

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COMMUNICATIONS: The initial step by management in building employee allegiance is to provide a clear channel of upward communications.

Key to Improved Productivity: Win Allegiance of Workers

By **Robert N. McMurry,** President, The McMurry Co., Chicago, and **John F. Sullivan,** Labor Relations Consultant.

Management must meet worker needs better than union to win this allegiance. The job is a tough one, but can be done.

A special questionnaire and use of "natural" leaders as spokesmen for workers will show employee needs to management.

■ Most company managements fail badly in their efforts to raise productivity. This failure is due to the use of wrong approaches and methods. More and more employee benefits, and appeals to the "reason" of workers to produce more, just don't work in most cases.

In other words, the so-called "human relations" approach doesn't work. If employee productivity is to be increased, management must face up to these unpleasant facts of life: Little or no improvement can be expected to take place voluntarily. Any better merit will be the result of discipline and pressure applied by management.

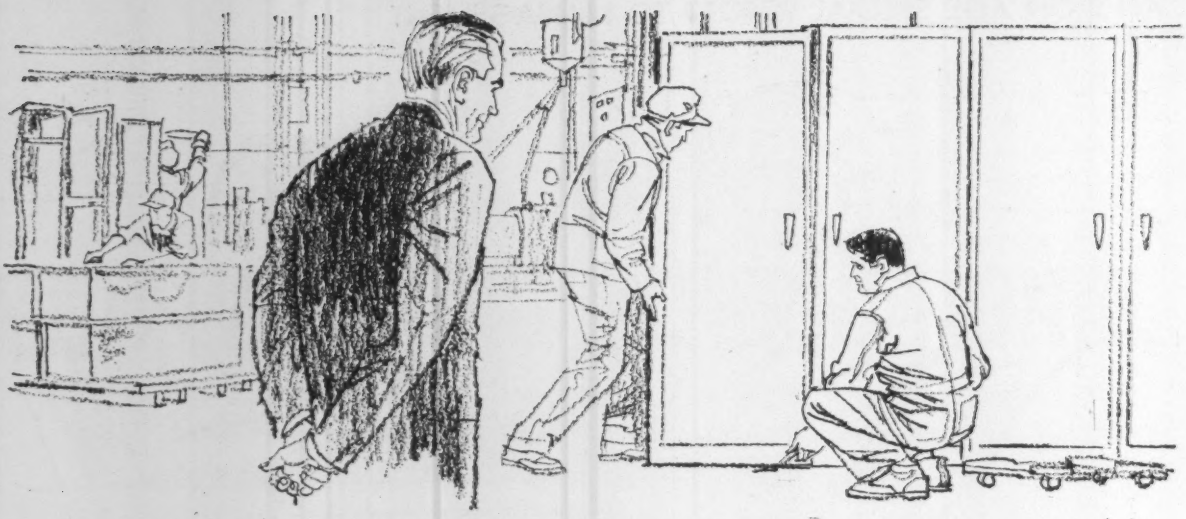
Employer discipline and pressure must be aimed at three main tasks. Individual workers must be told precisely what is expected of them and what is acceptable performance. Trouble makers must be eliminated, or contained. And first line supervision must be strong enough to support employees against threats of trouble makers and anti-management union stewards.

Big Challenge—This is a fine program, you may say. But it must be difficult to put into action. You are right. It is difficult, but not impossible. It is difficult because few employees welcome the prospect of being more productive (even though it will mean more earnings for them).

And unions will fight to the bitter end to protect even the most troublesome of its members. This makes it difficult to discipline offenders against company rules.

Also, few companies have supervisors capable of maintaining even nominal discipline in their departments, let alone support those who want to produce more. This is chiefly because most foremen are selected because of seniority, technical competence and docility. The last-named trait is euphemistically called "loyalty."

And lastly, few employers have the courage to run the union gamut of unpleasantness and to exert real



INTEREST: An employer must not wait until he is asked, or forced, to take action for the welfare of his employees. He must initiate it.

management discipline.

Grim Alternative—For these reasons, a realistic campaign to improve worker productivity is not to be taken lightly. On the other hand, despite difficulties, it may be preferable to the only alternative—the ultimate liquidation of the business. What is encouraging is that even partial improvement in employee productivity can make a big contribution to the fiscal health of a company.

While the conditions outlined here are difficult to combat, victory is not impossible. For example, the General Electric Co. under the leadership of Lemuel Boulware showed that much can be accomplished. Concrete evidence of this is also to be found in the fact that each year unions are winning fewer and fewer elections run by the National Labor Relations Board.

The key to both management and union power lies in the allegiance of the employees. What determines who will have this allegiance is the extent to which the workers believe that one or the other can give (or get) him what he wants. If employee productivity is to be improved, it is necessary first to increase worker identity with and allegiance to the company. Simultaneously, it is necessary to reduce worker dependence on, and need for, the union.

Guidance Needed—If this task is to be accomplished, it must be recognized at the outset that many employees distrust the motivations of management. And that the typical working man is frequently a grasping materialist. At the same time, he often feels extremely insecure, with a strong need for guidance, certainty and a predictable future.

In management's favor is the fact that the natural and normal allegiance of the worker is always to their employer. It is he who provides the job they occupy. One of the union's greatest weaknesses is that it cannot create jobs. It is because employers have alienated employees that most workers have turned to unions. It is necessary to reverse this process if allegiance of employees is to be regained, and union influence diminished.

If the employer can demonstrate that he will provide them with the security, status and other benefits they want, and his supervisors are strong and supportive, his workers will see no reason to identify themselves with or support the union.

The initial step in a program designed to build employee allegiance to the company is to provide a clear channel of upward communication. This is to find out the nature of worker problems, the areas in which they exist, and what the employees actually think and believe.

Deluded Management — Many managements are convinced their supervisors are providing this information. This is rarely true. Most foremen and others are so concerned with their own security that they actually serve as a barrier or screen to insulate top management from the realities of life at the hourly rated level.

In addition, top management is often prone to believe only what it wishes to believe—that everyone in the plant and office is happy and content. In reality, and in contrast, conditions may be unbelievably bad. This, more than anything else, convinces workers that their employer

NEXT WEEK

The winning of employee allegiance does not, in itself, guarantee an increase in productivity. In the last article of the series, the authors will describe the further steps needed to turn "happy" workers into "productive" workers.

is not only disinterested in them but is actually endeavoring to exploit them.

Improved upward communication is best accomplished by means of a special, two-phase employee opinion poll.

The first phase consists of a simple multiple-choice questionnaire covering such issues as working conditions, training, grievance handling, compensation, benefits, supervision, opportunities for advancement and management's attitudes towards employees. Everyone takes the poll (including all supervision). And every effort is made to convince everyone that identities will be completely protected. This phase of the poll provides an over-all quantitive measure of morale.

Depth Interviews — The second phase consists of personal interviews in depth with key employees in each worker, clerical and supervisory group.

At the time the questionnaire poll is taken, employees are told that a questionnaire can't cover all the matters of interest and concern to them. It is explained that management would like to talk to each of them, but this is not practical as there are so many. The employees are then asked to list, and submit with the questionnaire, the names of five fellow workers who they think best understand their needs and problems. These are selected as spokesmen whom management will interview in order to supplement the questionnaire.

The employees so named tend to be the natural leaders, the opinion molders of their groups.

Naturally, unions are opposed to polls of this type. However, when it is explained that the poll taking is within the employer's rights, most unions cooperate readily and fully.

Ice Breaker — The interviewer starts the interview with each spokesman by reporting the responses to the written poll. With these responses in the forefront, the spokesman can usually be induced to discuss every aspect of the job at length.

LEADER SELECTION: Management cannot talk to all employees. It must select the "natural" leaders and work with them as spokesmen for all.

Not only are complaints and grievances aired but attitudes of the work force as a whole are revealed. Detailed descriptions of the personality make-ups of first and second-line supervision are also obtained with crystal clarity. Thus management obtains an image of itself, its supervisors, and its policies and practices which it could obtain from no other source. It can see itself as its employees see it.

Unless top management is willing to take appropriate corrective action on the basis of the poll findings, it might as well abandon any hope of improving its workers' productivity. The employer must demonstrate on his own initiative a little interest in and concern for the welfare of his people.

For example, in those cases where there is good reason to continue a condition or practice that may be considered unsatisfactory, then an explanation by management of the reasons will be enough.

Tough Decisions—But many remedial steps will not be easy to take. They may necessitate changes in policies and practices of long standing. Of even greater difficulty, changes in supervision may be demanded which are not easy to make. Often the men with the longest service, the greatest loyalty to management and the highest technical ability are the least qualified as leaders.

In any campaign to establish worker allegiance to the company, it is also necessary that the employer establish clear channels of downward communication.

In this case, effective use can be made of the same natural leaders who have already provided a clear channel of upward communication. They are assembled separately by departments (in groups of five) and are first thanked for their earlier contribution. They are then told that top management has an important message it would like to convey to the rank-and-file personnel. They are told management would first like to submit the material to them (spokesmen) to obtain their reactions.

Since these spokesmen are alert articulate people, their comments are almost invariably constructive and valuable. Most significant, however, is the fact that these natural leaders understand the message, believe it and accept it. And they will transmit it with conviction.

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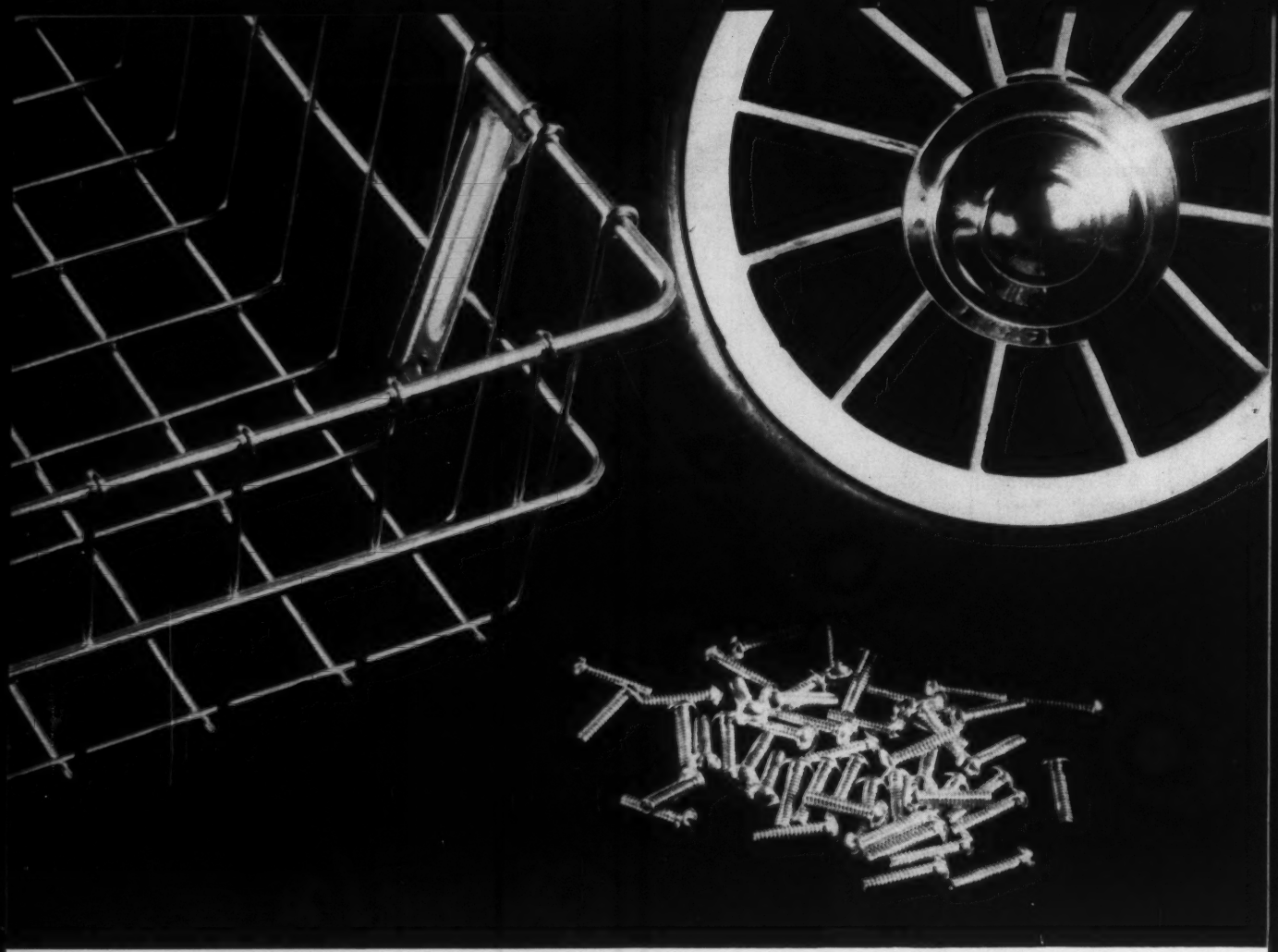

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Some Automakers Limit Changes

There Won't Be Model-for-Model Matching

Last week The IRON AGE told what is expected in the 1962 cars from GM and Ford.

This week it previews new cars from Chrysler, American Motors, Studebaker-Packard.

■ Chrysler Corp., American Motors Corp. and Studebaker-Packard Corp. aren't going to try to match General Motors Corp. or Ford Motor Co. on a model-for-model basis.

Here's a digest on what Chrysler will offer this fall:

Plymouth will go against the two sizes of Chevys and Fords with only one size. The wheelbase will be trimmed two in., from 118-in. down to 116-in. At the same time, overall length will be shortened by about seven in., making the car about 202-in. long—putting it just out of the top side of the compact group.

Styling Changes — Fairly extensive styling changes will be made; dual headlights will be spaced across the front.

Dodge Dart will continue to use the Plymouth body shell. Sheetmetal changes for front and rear fenders plus distinctive trim, including grille and taillights, will change the appearance enough so the Dart will have its own style appeal. However, Dart front fenders still have the ridge on top. Headlights have been offset, with one pair on the fenders and the other in the grille.

Dodge Polara will stay at the top of the Dodge line as Chrysler's only low-medium price offering. Like the Dart, the last vestige of a fin will disappear.

Valiant and Lancer, the compact twins, get only a mild freshening. The simulated wheel cover on the rear deck of the Valiant will be gone. And canted taillights in the fender are replaced by round lights in the body. Both will have bucket-seat models for the first time.

Rounded Line—Chrysler's large, canted fins have become a rounded line and taillights are recessed into the rear quarter panels. Front treatment is the same as this year with canted headlights in the fenders.

Imperial, too, has shed its fins. But changes are not too great. The 1961 grille has been modified by splitting it. The free-standing headlights, introduced for 1961, will be back again for 1962.

American Motors Corp. continues its policy against change for change sake.

Unchanged—Rambler American, all new this year, will be nearly unchanged. The Rambler will get only minor changes. The Ambassador, on a 117-in. wheelbase, may prove more popular in 1962 when the other automakers introduce models more directly competitive with it.

Studebaker plans a sportier look for its Lark. The roof is flat and slim, patterned after Ford's Thunderbird. The grille is patterned after the Mercedes-Benz.

The Hawk series is being revived and the company is hoping it will finally catch on. It is new from front to back.

The car has a distinct foreign flavor as the body lines slope slightly from the center.

Here's the 1962 Look

Chrysler Corp.

Plymouth—Standard car will have a shorter wheelbase and fairly extensive styling changes. Valiant will get bucket seats and a face-lift.

Dodge—Polara will lose the last trace of a fin and stay in the medium-price field. Dart will be pared down with the Plymouth and get extensive styling changes. Lancer goes sporty.

Chrysler—Canted fins give way to a rounded line for the rear fenders. Taillights are set in the rear panels.

Imperial—This is still a big luxury car. There are a few changes in the front, including a split-grille effect. The sweeping fins on the rear have disappeared.

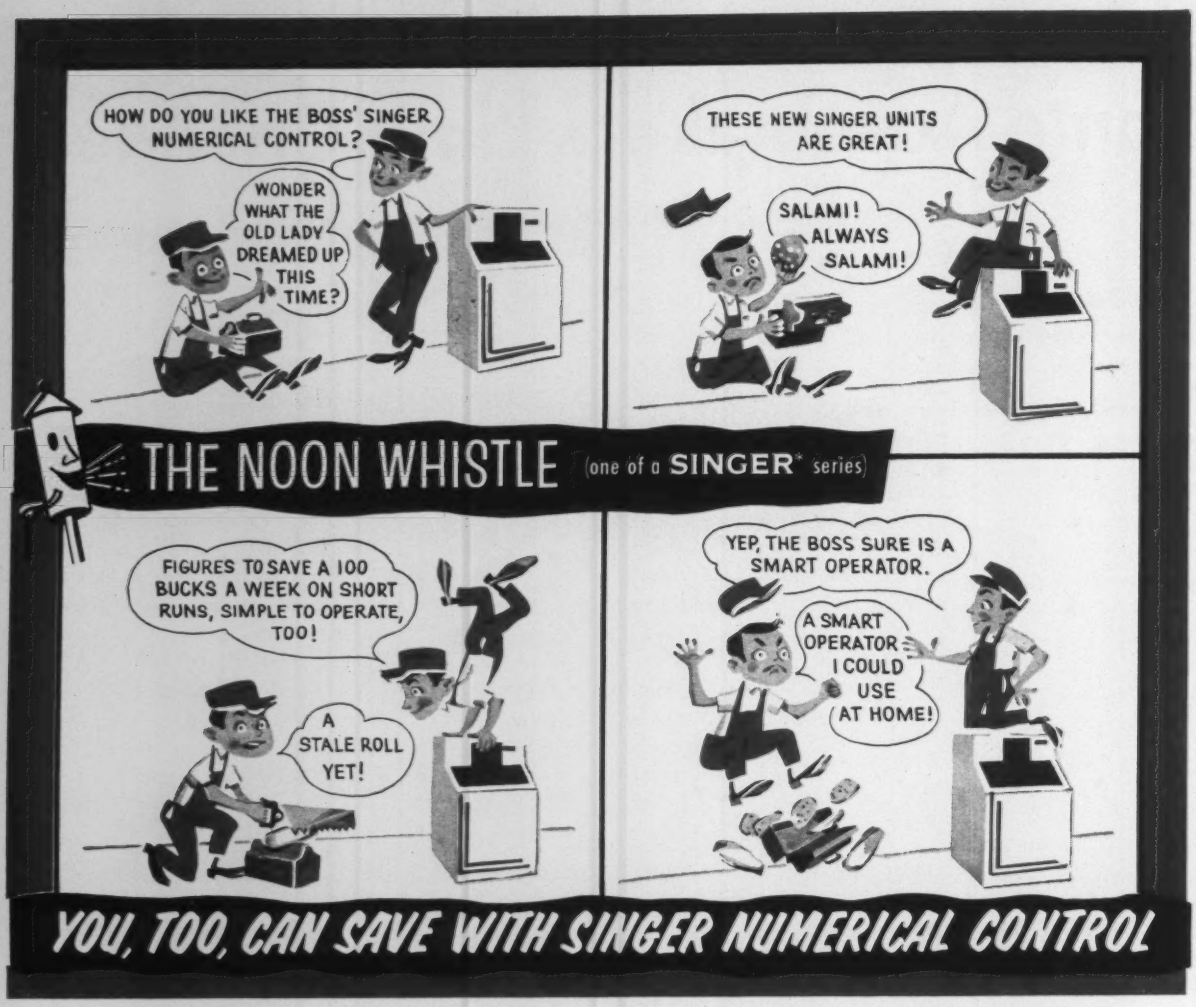
American Motors Corp.

Rambler, American, and Ambassador continue the company's fight against "planned obsolescence." Changes are few and are mostly in the trim areas.

Studebaker-Packard Corp.

Lark—A sportier appearance comes from the T-Bird roof and the Mercedes-Benz grille.

Hawk—This semi-sports series is being revised and the new styling reflects foreign influence.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(2) Jig Bore 38 Holes in each of Three Chassis	3 Hours/10 Min. x 3 Pieces = Total 9½ Hours	First Piece — 25 Min. Second and Third Pieces — 16 Min. Total 41 Min.
(3) Nine Motor Housings		
a. Layout 6 holes and drill on faces of housings	1 Hour/10 Min. x 9 Pieces = Total 10½ Hours	First Piece — 23 Min. Next 8 (total) — 48 Min. Total 71 Min.
b. Layout 7 holes and drill on outside diameters of housings	1 Hour/30 Min. x 9 Pieces = Total 13½ Hours	First Piece — 26 Min. Next 8 (total) — 72 Min. Total 98 Min.
Grand Total:	41½ Hours	5½ Hours

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Aircraft Outlook Brightens

Space Era Means More Interest in Planes

There's still a future for manned aircraft. And plane manufacturers say it's a very big future.

They predict that 1000 cargoliners will be needed in the next 15 years.
By R. R. Kay

■ Is the handwriting on the wall for aircraft? Are the fantastic strides in space numbering the days of airplanes?

Nothing could be farther from the truth. In fact, the space era opens a wider future for planes.

"Manned aircraft now under development will achieve very important improvements in the economics of moving people and cargo by air," says Fred Dickerman, a top engineering management man at Lockheed Aircraft Corp.

The Effects—He believes these new craft will vastly step up:

(1) High speed cargo transportation, both military and commercial.

(2) Supersonic passenger transportation.

(3) Vertical take-off and landing aircraft, for military and commercial short hauls.

(4) More use of private and corporate aircraft.

Behind the bright outlook for craft of this type are technical advances spurred by the space era. Examples: New propulsion concepts and state-of-the-art advances in structures.

What's now on the production lines or in planning stages?

Quick Trips—Jet-freighters that will move cargo at 500 mph at a 4¢ per ton mile. And the much talked about supersonic jetliner that will fly from New York to Los Angeles in 90 minutes.

Aircraft industry forecasters see air freight zooming from 1960's one billion ton miles to 40 billion by 1975. If they're right, 1000 cargoliners will be needed within the next 15 years.

Even at that, only one per cent of all U. S. and foreign freight will move by air.

Vertical-take-off-and-landing aircraft (VTOL) have a future, too. They could be the answer to beating the problem of ground traffic to and from airports.

Such short haul planes could fly in all kinds of weather. They'd carry 60 to 80 passengers.

Business Planes—As for business flying, expect a big rise there. Large corporations will tend more and more to own their jetliners.

Little-known fact: General aviation—all civilian planes except commercial airliners—is the largest user of the nation's air space.

To Transport Minuteman ICBM

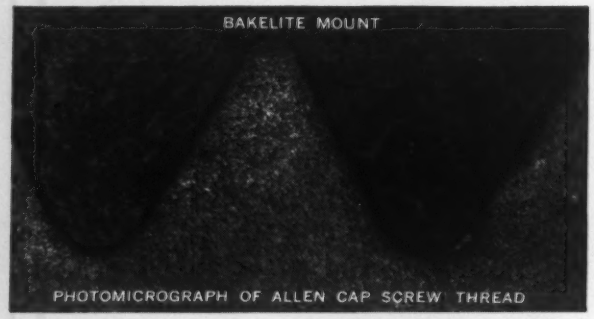
SHIPPING CONTAINER: The Air Force is using this new transporter-erector to haul the Minuteman ICBM. The unit's side panels, rear doors, and all access doors are made of magnesium. The roof and floor are aluminum. Reason for the lightweight container is highway load limits. All work on the new carrier is by Boeing Airplane Co.

PQA* proves it

This Allen screw passes multi-million-cycle test under high load conditions

50X Magnification—unretouched

Here you see a competitive socket-head cap screw where thread laps and deep decarburization (lighter area running through roots of threads) caused premature failure of the screw. When used under high load conditions in an outboard crankshaft-connecting rod-piston assembly, such a screw failure would cause great motor damage.



50X Magnification—unretouched

Now look at this Allen Socket Cap Screw. Photo was taken during regular quality control test and shows no thread lap or decarburization. Allen is producing to and inspecting in accordance with MIL-B-7838A for thread discontinuities—your assurance of quality!

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Obsolescence Limits Automation

Builder Outlines Economic Handicaps to Systems

Automation implies high production but there are limiting factors to the systems.

One builder claims obsolescence, not productivity, is the chief barrier for automation lines today.

By R. H. Eshelman

■ Many people today, besides unions and management, are concerned with automation, productivity and jobs. But misunderstandings and confusion have crept into political and public life.

Automation signifies high production. It has made technically possible, if not always economically feasible, nearly any production pace desired.

Economic factors, however, limit fixed-program automation systems.

Limited Aspects—These include customer demands for individualized products; a variety of causes of downtime; and inflexibility of some conventional automation lines.

Carl F. Stugard, vice president and manager of the Special Machine Div., Cincinnati Milling Machine Co., claims, "It is obsolescence, not productivity, that is the limiting barrier of automation lines as we know them today."

He points out that a time chart of relative man-hour requirements in production shows: 1. Since the introduction of power feed to machine tools in the early 1800's, there has been a steady drop in the number of man-hours required to produce a given part; and, 2. Since 1930, any company taking full advantage of new developments in machine tools has been able to double its metal cutting productivity every ten years.

CRACK DRILL TEAM: Two tape-controlled Burgmaster turret drill presses are operating at General Electric Co.'s Atomic Power Equipment Dept. They form a crack team to make holes in reactor components.

These trends, he says, show no signs of slowing down.

Large Role—Automation is responsible for a large part of the increase.

First, it was automatic screw machines; then batteries of varied cutting tools linked in transfer lines.

Now numerical control affords the means of developing variable-program automation.

Big question is how far can this trend to automatic production go?

Metalworking Change—We can see signs that metalworking is changing from a batch to a process industry in some areas, says Mr. Stugard.

The problem is flexibility: how to make one product this week, another the next?

One way may be to stop equipping plants in bits and pieces.

Many experts doubt that the wholly automatic factory will ever be built. Total automation can only be economically justified where products like safety pins, ball bearings or machine screws are needed in unending profusion.

Instead, the future trend is likely to be to selectable program automation—where numerical control, or other mechanical systems, inject more flexibility into the automatic production concept.

MEN IN METALWORKING

Republic Steel Corp. — H. H. Chapin, appointed general superintendent, southern district.

Jones & Laughlin Steel Corp.— Laszlo Pasztor, appointed senior research chemist, Research Div.

Sharon Steel Corp.—I. A. Varraux, appointed manager, industrial relations.

Kaiser Aluminum & Chemical Corp.—R. C. Dunn, appointed administrative manager, Baton Rouge Works.

J. F. Krepley, appointed director, extrusion operations, Metals Div., Olin Mathieson Chemical Corp.

W. H. McCormick, appointed metallurgical engineer, Crucible Steel Co. of America.

Peninsular Steel Co. — W. I. Trader, elected president.

Edgcomb Steel Co.—V. M. deCastro and W. H. Franklin, Jr., appointed directors; Leslie Edgcomb, Jr., elected vice president, operations.

Colorado Fuel and Iron Corp.— L. E. Wolfe, appointed superintendent, Power Div., Pueblo plant.

National Castings Co. — R. G. Parks, elected vice president; R. C. Lewis, named controller; Roy Willison, named vice president and general manager, Industrial Div.

Republic Supply Co. — R. M. Chewning, elected executive vice president.

Inland Wire Products Co.—R. H. Shepard, named sales manager, Chicago.

Olin Mathieson Chemical Corp. —R. W. Pierce, appointed sales manager, extrusion operations.

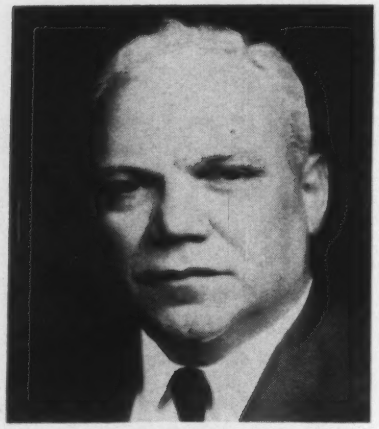
General Electric Co.—T. J. O'Rourke, named sales manager, business data-processing equipment; W. F. Prince, appointed central regional manager; V. L. Schatz, appointed manager, internal sales, Computer Dept.

Radio Corp. of America — Dr. R. M. Wilmotte, appointed project manager, relay communication satellite program; R. M. Gordon, named manager, training and education, commercial systems dept., EDP Div.

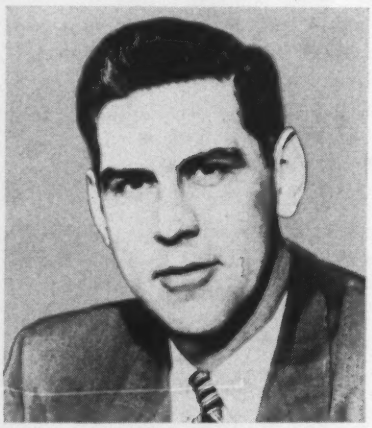
Westinghouse Electric Corp. — Dr. Patrick Conley, elected vice president, industry systems dept.; C. J. Weber, named asst. manager, and A. C. Chiazza, named sales manager, aerospace electrical dept.; William Rudloff, named acting manager, heat transfer dept., steam div.

Motorola, Inc.—J. R. Linicome, appointed division market planner, Military Electronics Div.

(Continued on P. 82)



W. T. Bertier, elected vice president and general manufacturing manager, Revere Copper & Brass, Inc.



R. T. Eakin, appointed vice president, Engineering and Construction Div., Koppers Co., Inc.

R. E. Schroeder, appointed regional vice president, Luria Bros. & Co., Inc.

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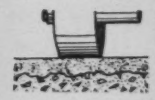

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(Continued from P. 80)

Ford Motor Co.—John McDougall, appointed director, manufacturing engineering and development office; D. T. Axon, appointed manager, facilities planning dept., Automotive Assembly Div.

Chrysler Corp.—H. D. Lowrey, appointed general manager, Defense Operations Div.; J. C. Smith, Jr., appointed asst. general manager, Missile Div.; Lovell Lawrence, Jr., appointed director, Advanced Projects Organization.

Mack Trucks, Inc.—Lee R. Morris, appointed manager, value engineering; J. R. Zwerle, named manager, research and administrative analysis, Purchasing Div.

Volkswagen of America—H. J. Harman, appointed special truck sales representative.

A. O. Smith Corp.—J. M. Richardson, named manager, marketing, Electric Motor Div.

Dura Corp.—W. W. Hasenzahl, appointed manager, Page & Page Div.

Allis - Chalmers Manufacturing Co.—H. W. Cory, appointed asst. general manager; D. H. Lory, appointed asst. works manager, Norwood Works.

R. C. Mahon Co.—C. M. Hargraves, appointed vice president.

Hexcel Products, Inc. — W. S. Powell, elected president and chief executive officer; R. C. Steele, becomes chairman of the board.

Hauck Manufacturing Co.—J. E. Zwit, appointed vice president, sales, Engineering Div.

Harrington-Wilson-Daum Corp.—J. P. Finn, appointed vice president, sales.

Hardinge Co., Inc.—H. DeForest Hardinge, appointed vice president.

Eaton Manufacturing Co.—E. W. Clark, named director, marketing services.

McKay Machine Co. — F. H. Dreher, appointed vice president and secretary.

R. J. Garmy, appointed superintendent, Warren, O., plant, Republic Steel Corp.

James Ambrose, appointed general superintendent, Trenton plant, McLouth Steel Corp.

J. I. Case Co.—J. T. Brown, elected president, J. I. Case International, S. A.; L. T. Newman, elected president, J. I. Case Credit Corp.; L. H. Hodges, named director, Product Planning and Engineering Research Dept.

Sel-Rex Corp.—G. A. Smith, named sales engineer, New England.

Borg-Warner Corp.—James Mertz, appointed treasurer-controller, Calumet Steel Div.

Worthington Corp.—A. H. Cercone, appointed manager, parts service, Marketing Services Group.

Reed Roller Bit Co. — L. E. Luthy, appointed manager, market development; R. R. Wright, named vice president; Martin Hoza, named chief engineer, Cleco Air Tools Div.

Rotor Tool Co.—James Davis, named sales engineer.

Osborn Manufacturing Co. — G. M. Shibley, named sales manager, Brush Div.

General Dynamics/Electronics—S. E. Benson, appointed manager, long range planning, Marketing Div.

International Ultrasonics, Inc.—George Piehler, named chief mechanical designer.

Advanced Vacuum Products, Inc.—Herbert Schwartze, appointed vice president and general manager.

Aerojet-General Corp.—Sal LaFaso, appointed manager, administration dept., and S. W. Kerkering, appointed manager, production dept., Atlantic Div.

Ward Hydronics, Inc. — E. P. Jensen, appointed manager, manufacturing.

Parker-Hannifin Corp. — R. H. Davies, appointed president, International Div.

Hanson-Whitney Co.—Augustus Vogel, appointed vice president and director, sales.

Hill-Chase & Co., Inc.—E. J. Howe, appointed vice president, sales; Donald MacCallum, named asst. vice president.

Davis Fire Brick Co. — G. R. Eusner, elected executive vice president.

Edwin L. Wiegand Co.—F. B. Knight, appointed vice president, and G. E. Ammerman, named general sales manager, Chromalox, Inc. Div.

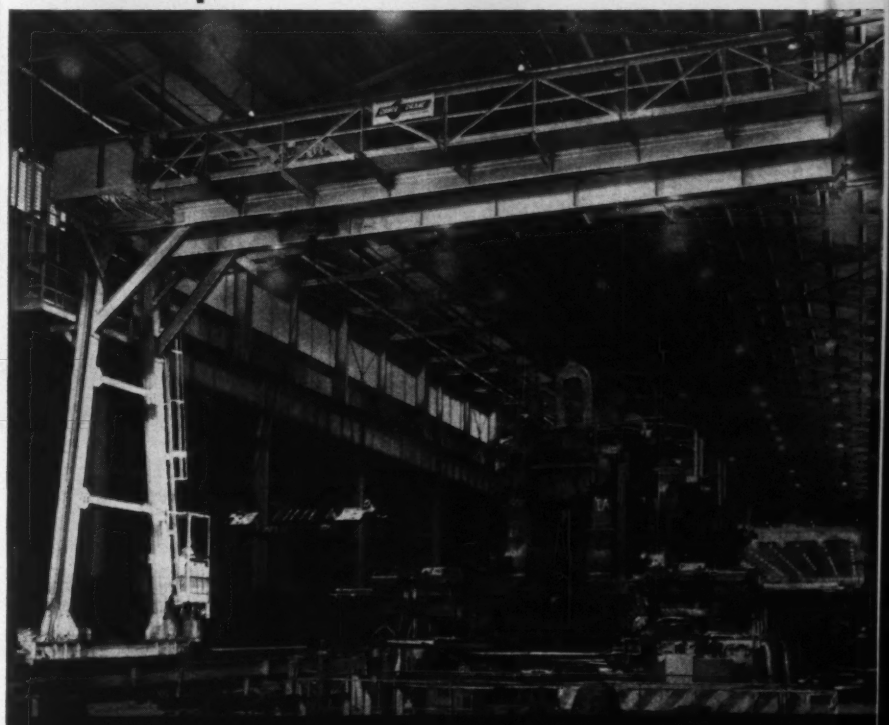
Dynamic Gear Co.—T. A. Williams, appointed vice president and general manager, Dynaco Mechanisms & Engineering Div.

Avco Corp.—Dr. R. M. Smith, named chief engineer, ordnance operation, Electronics & Ordnance Div.

Geophysics Corp. of America—J. H. Durant, named manager, standard products, Vacuum Specialties, Inc. Div.

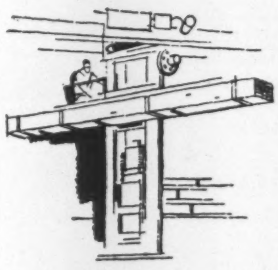
CONCO OVERHEAD TRAVELING CRANES

in capacities to 150 tons



Conco Semi-Gantry Crane custom-engineered for service in a Chicago area steel mill

CRANES HOISTS CONCO



Write for Crane Specifications Tablet containing five sets of general service crane specification data and forms.

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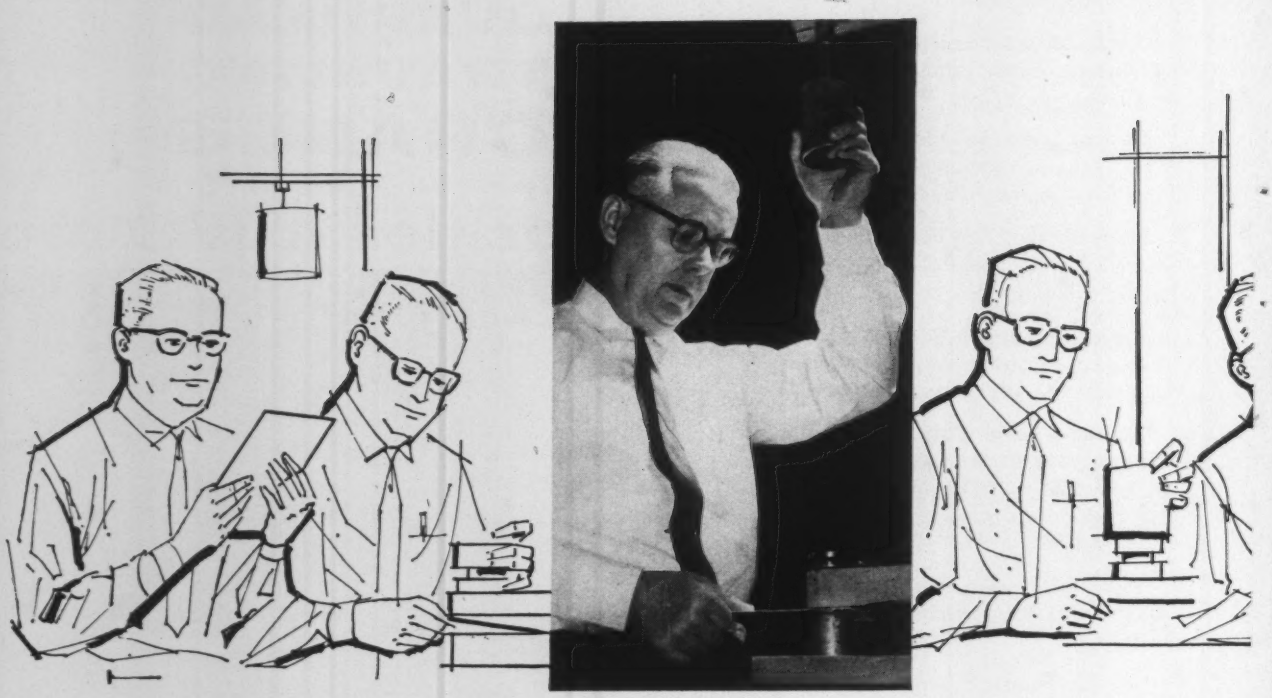
CHICAGO TRAMRAIL, manufacturer of "Trak-Rak" Stacker Cranes, Monorail Systems, and "Fas-Lok" Storage Racks at 1330 S. Kostner Ave., Chicago, is now a DIVISION OF CONCO ENGINEERING WORKS, INC.



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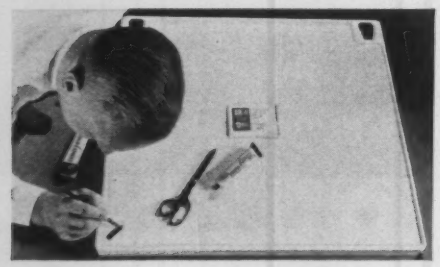

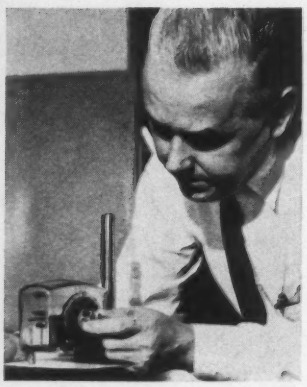

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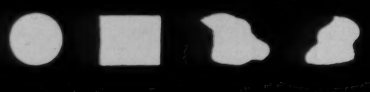

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Network Tracks Orbit

Before an astronaut orbits in the Mercury capsule, NASA plans to test a worldwide tracking network. It's in the setup stage now. In contrast to Soviet secrecy, this will let the whole world sit in on our first manned orbital flight. A scout rocket will calibrate the network.

Fresh Air for Outer Space

Around the home, a mouse is a nuisance. But at the Lockheed Missile and Space Co. one mouse has VIP status. He's alive and perky after

MOUSE POWER: Activates KO_2.

80 hours in a life cell. At a simulated 75,000-ft altitude, this rodent's only source of oxygen was 100 g of activated potassium superoxide.

Compete in Space, Or Else

Congressmen are eying the role of private enterprise in communications satellites. Subcommittee hearings are already scheduled for next month. Congressional opposition arises over the chance of private companies getting a monopoly in space. Subcommittee Chairman Sen. Russell B. Long, asserts, "Congress has a clear duty. It's up to us to see that the communications-satellite field is thrown open to free competition."

Money for Man on the Moon

A national sense of urgency is spurring U. S. plans to put a man on the moon before 1970. President Kennedy's expanded space-spending program includes new moon-shot money. Legislators are backing it, almost without a whimper. Moon-launching plans, now assured of approval, will tee off with an outlay of $549 million for the next 12 months. Ultimately, the lunar-exploration program will cost 7-9 billion dollars.

Nuclear-Test Substitute?

New from the Navy is a 180-ft conical shocktube. In it, 5-lb charges yield blastwaves equal to those of six World War II blockbusters. This points the way toward larger units that will build up blastwaves of nuclear proportions. In light of the nuclear test ban, the shocktube program has great significance. Eventually such devices may permit study of H-bomb blast effects without actually triggering a nuclear explosion.

Cushions Lunar Landings

Inflated-fabric cushions will stabilize and absorb landing shocks on the moon. That's the opinion of Goodyear engineers who built a full-scale, lunar-probe model. Special decelerators are the key items. They're made of tear-proof fabric that's inflated just before landing. Dynamic tests on the model verify computer predictions of impact rebound and landing stability.

Totes Deflated Satellite

Working under a tight schedule, Wyman-Gordon Co. is forging large dish-shaped magnesium parts. Two of these 40-in. diam x 13-in. deep forgings will serve as a container when the

FORGED CONTAINER: Opens in space.

collapsed Echo A. 12 communications satellite is launched. After the container has been lofted into orbit, a ground signal will release a self-inflating aluminized plastic sphere.

New technique makes possible easy-to-machine steel extrusion dies from molybdenum

At 4600°F thorium becomes a liquid. Bismuth boils. Antimony vaporizes. But molybdenum remains hard.

To help you take advantage of molybdenum's hardness—and heat resistance—Sylvania now makes available molybdenum for forging into extrusion dies for steel, titanium and other metals. Thanks to its new isostatic pressing and sintering operation, molybdenum powder of controlled particle size can be formed into forging blanks that permit you to produce intricate shapes and patterns for your dies. Because of molybdenum's high temperature characteristics, these dies far outlast conventional dies. Sylvania also produces billets and ingots for forging, electrodes for arc casting, blanks for machining and machined parts.

Shouldn't you consider refractory metals in meeting your needs? The same properties that solve the problems of throat inserts for rockets and missiles can work for you in piercing points, die-casting dies and cores, in truing grinding wheels and in many other ways. For the full story or help in checking out a special idea write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

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GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

How to Avoid Bearing Failures

There are nine reasons why ball and roller bearings fail prematurely. Eight of these reasons center on abuse.

By avoiding these pitfalls, you can extend bearing life.

■ Ball and roller bearings don't last forever. All types and makes of bearings fail eventually. However, it's important to separate natural endings due to normal fatigue from premature failures.

When the life of a ball or roller bearing draws to an end, a tiny patch of flaking usually appears on one of the tracks. Once it starts, this flaking action spreads quickly. As the bearing's life ebbs, noise develops.

Nine Causes—Now, let's consider the factors that cause premature failures. Among these bearing-life shorteners are: Malformation of bearing seats on shafts or in housings; misalignments; faulty fits; wrong fits; and inadequate or unsuitable lubrication.

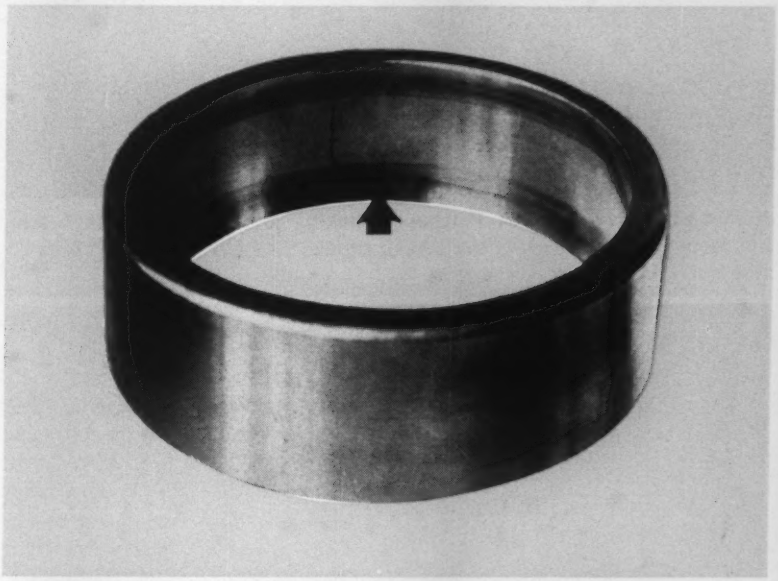
Other common causes of premature bearing failures include: Defective seals; vibration while a bearing isn't rotating; the passage of an electrical current through the bearing; and defects in materials and/or errors in manufacture.

All bearing makers supply carrying-capacity data. These ratings presuppose that the thin race rings will be fitted on or in perfectly-cylindrical seats. Due to variations in production methods, many bearing seats are open to criticism.

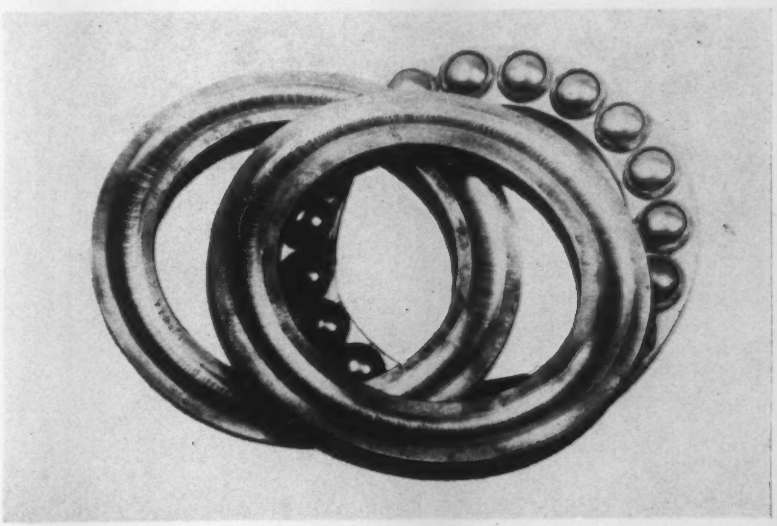
If you don't obtain intimate contact between a bearing's ring and its seat, you're going to have "yield-in-the-ring" problems. This causes small movements of the ring in relation to the housing or shaft.

Uneven Loads—Ring movements, in turn, give rise to what's commonly called "fit rust". When only part of the ring makes proper contact with the housing, bearing loads are unevenly distributed.

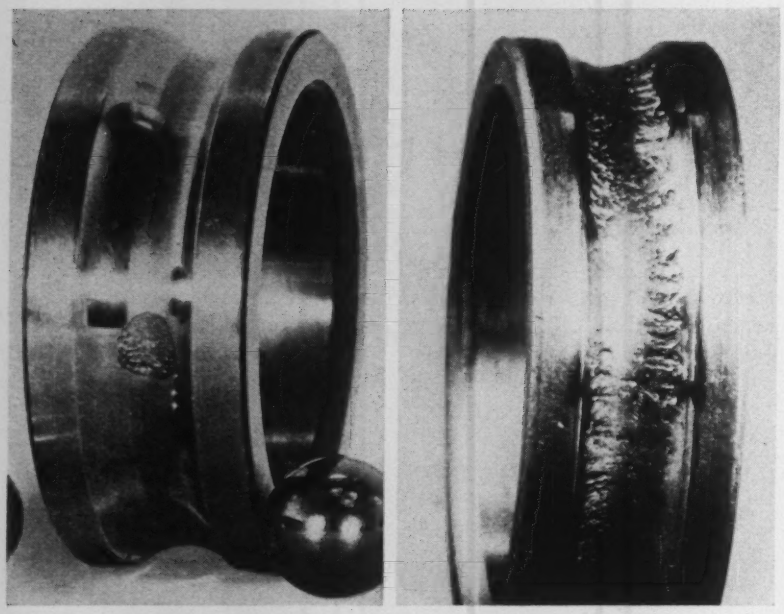
These off-center loads may cause flaking on the balls or in the roller tracks. Yielding of the ring due to inadequate support also causes



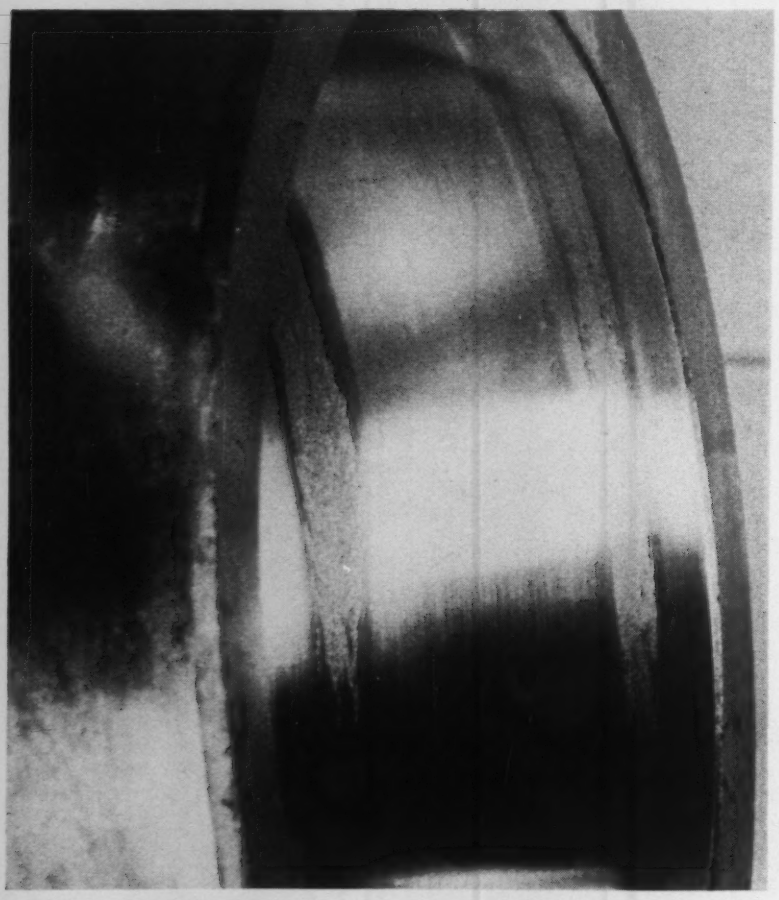
POOR CONTACT: Off-center loads cause accelerated-fatigue cracks.



ELECTRICAL DAMAGE: Short circuiting a heavy current through a bearing creates burns and craters in the races. These fluted craters resemble a string of beads. The metal melts in the heat-affected zones.



ADVANCED FLAKING: Patches of flaking join each other as bearing life ebbs. In early stages, these heat-producing patches are far apart.



LUBRICANT ERROR: Smearing and braking problems crop up if too much and too solid a lubricant is used. This can cause overheating.

accelerated-fatigue cracks.

Misalignment errors are another common factor behind premature bearing fatigue. Too often, the face of a shaft's shoulder isn't square with the shaft's center line. Then if you use a heavy axial pressure to force the bearing's ring on such a shaft, you're in trouble.

Avoid Force — Heavy pressure forces the ring to adapt itself to the misaligned condition. But, capacity and running performance are both affected. Thus bearing life tumbles.

Whenever two bearings support the same shaft, they must have a common center line. A spokesman from SKF Industries, Inc., Phila., says that in the case of slightly out-of-line centers, you can switch to self-aligning ball or roller bearings.

These self-aligning bearings function without setting up bending movements. But in the case of marked misalignment, heavy loading still results. This is a frequent source of early flaking.

Faulty Fits—Bearings are easily damaged by careless handling and fitting. Cleanliness is always a must. It's not uncommon to find foreign matter — even destructive turning chips—in a bearing.

Blows sustained in fitting show up as depressions in the track at the points of contact with the balls. These points form the nuclei of future flaking patches.

Bearings treated in such a manner run quite noisily. Supplementary loads also tend to build up if a shaft supported by two bearings lacks room for expansion. This heavy-thrust condition causes flaking on the sides of the rings.

Wrong Fits—In many cases, the character of the load requires tight bearing-ring fits on the shafts. These tight fits prevent movement or creep. If creep occurs, wear on both the bearing bore and the shaft spirals.

Wear reacts on the creep. It accelerates additional creep. Thus

a vicious circle is set up. In the end, both the bearing and the shaft are ruined.

Faulty lubrication is another common problem. Although a bearing's lubricant needs are small, correct lubrication is vital. A whistling sound and/or temperature rise reveals a lubricant lack. Of course, a heat rise sometimes signals too much lubricant which can lead to drag.

Braking Action — Overheating may soften the hardened rings and the rolling elements. Lack of lubricant can also create cage wear. Smearing of the tracks and the rolling elements accompanies this wear.

Lack of lubricant deprives the rollers of some of their freedom. Flats result, when the rolling action is hindered.

Grease that's too stiff or oil that's too thick produces a braking effect. This braking action makes the rollers slide on their track. It also smears and streaks the metal surfaces. Such braking effects are most likely to happen in large bearings spinning at high speeds.

Defective Seals—One of the most common causes of bearing failures is inadequate sealing of the housings. Poor seals let dust and dirt enter the bearings. This opens the door to track and roller wear.

The wear appears as a fine uniform "finish" on the contact surfaces. A felt washer by itself can't insure protection if the bearing operates in an atmosphere which is charged with abrasive dust.

Occasionally, wear caused by the intrusion of foreign matter is shown by fluting. This problem becomes more common when vibration is present.

Defective seals also allow moisture to enter a bearing. Naturally rust occurs. Unsuitable lubricants also help to cause bearing rust. As these lubricants disintegrate, their constituents corrode the steel.

Vibration—It's a known fact that fretting occurs in a loaded ball or roller bearing when it isn't running. Due to load variations under these circumstances, tiny sliding movements take place. Most of these movements are localized where the rolling elements contact the tracks.

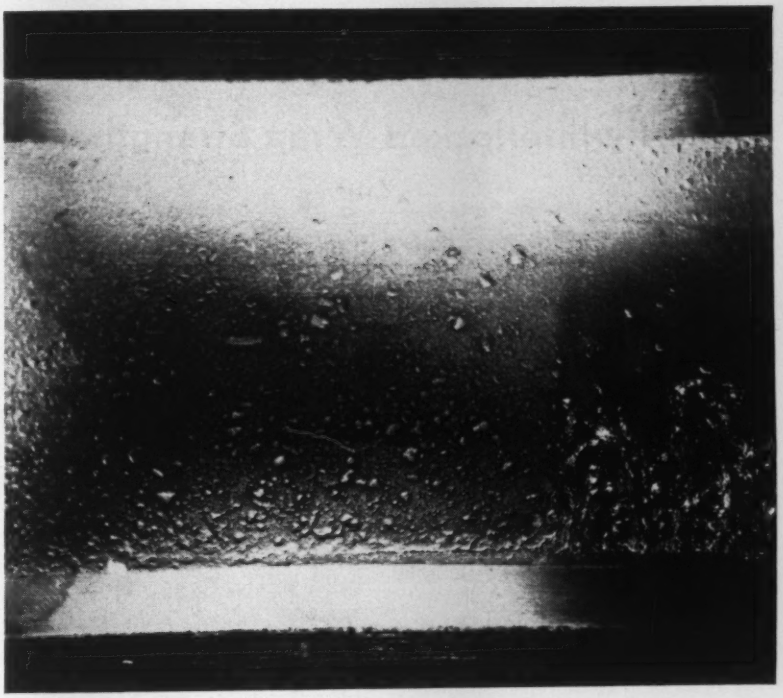
The patches of wear produced by vibration while the bearing isn't rotating can be easily recognized. They're separated by a distance equal to that between the rolling elements.

Now, let's investigate damage caused by electrical currents. The short circuiting of heavy currents through a bearing causes burning and craters due to arcing and melting at the points of contact.

Even weak currents create short-circuit problems. Repeated passage of these weak currents causes fluting in the races. The steel melts in the affected zones.

During the "short", a number of small craters form. If the current is alternating, these depressions or craters follow one another along the track. In essence, they resemble a string of beads.

Bearing damage due to electrical shorts is now rather rare. Most electrical-machinery makers provide suitable diverters which make this problem a thing of the past.



EDGE LOADING: Bearing misalignment also causes flaking problems.

Inherent Defects—When a bearing becomes damaged and the cause isn't readily apparent, suspicion often falls on the materials or the manufacturing methods. In most cases, however, a thorough check would pinpoint the true cause of damage.

Although defects in bearings are very rare indeed, this factor can't be entirely overlooked. Possibilities include defects or flaws in material such as slag inclusions.

One possible manufacturing error centers on overheating during grinding. The result of this error may be fine cracks. Another very unusual occurrence is defective hardening. It's readily revealed by a porous condition which develops after a short period of use.

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Tape-Wound Titanium Scores

Helically-Interlocked Wrap Strengthens Pressure Vessels

A new angle in tape winding brightens the outlook for a high-strength titanium alloy.

As a result, the transverse strength of cold-reduced tape can be put to full use.

■ Using metal wire or tape reinforcement in pressure vessels dates back at least a century. High-tensile steel wire has been used as the banding material on certain rifles and guns as well as in other hollow bodies.

Up to now, however, little has been done to utilize the transverse strengths of wire or tape to support the axial stress in pressurized vessels. Fabricating parts by winding is a natural with today's highly automated controls. Thus, many companies are taking a second look at their methods.

Pressure vessels for use in solid-fuel rocket-motor cases are the latest job on the tape wrapping agenda. Here, the metal tape voted most likely to succeed is titanium.

Specially Wound—Curtiss-Wright Corp.'s Wright Aeronautical Div., Wood-Ridge, N. J., has already put two types of titanium tape to work using a new winding principle. It's called helically-interlocked tape winding.

The tapes having I-beam and channel cross sections are wound on a removable mandrel. The winding device functions so as to lock each turn with the preceding turn.

Much time was given to the choice of the tape's cross sections. The reason: To give the final cylindrical vessel the proper ratio of hoop-to-axial strength. Also, designers made use of the longitudinal as well as transverse strength of the tape.

Proper Fit a Must—One of the more important factors of fabrication rests with the fit between the locked tapes. An interference fit was perfected to reduce bending to tensile stress in the individual tape elements.

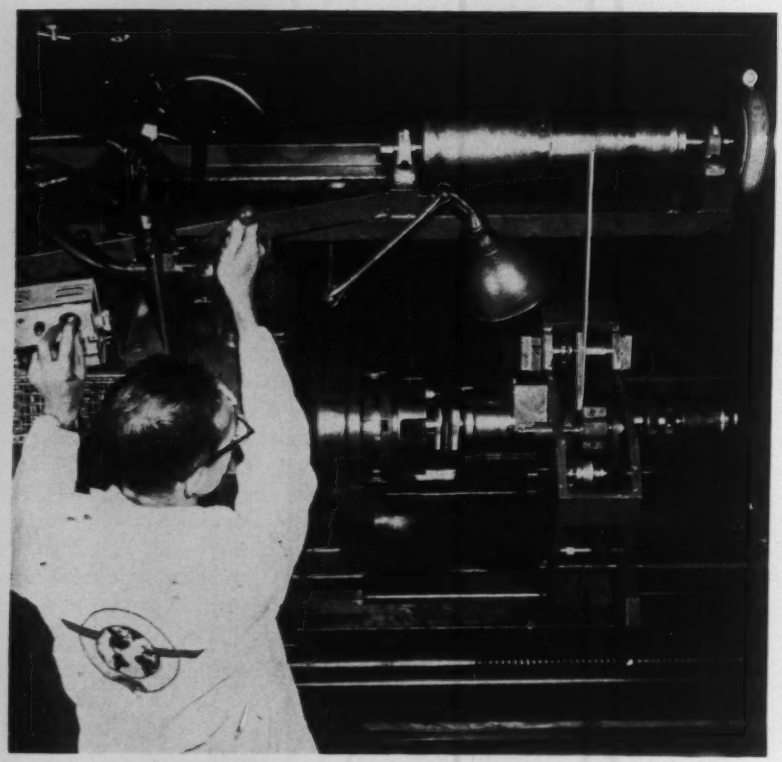
Helically wound interlocking tape tends to unwind under pressure. Here, again an interference fit is vital. A proper fit between tapes withstands the unwinding tendency through friction. Stress analyses indicate that the torsional shear stresses are low and the friction between tapes will restrain the vessel from unwinding.

Maintaining a proper fit is not as simple as it might seem. It's related to the mechanical properties of the material used, the coefficient of static friction and the forces used in assembling the vessel. An even more important factor is the accuracy with which titanium tape can be produced.

New Alloy—The winding process makes use of a relatively new high-strength titanium alloy (B120BCA). The metal's high strength-to-weight ratio makes it a top choice for the rocket motor casings.

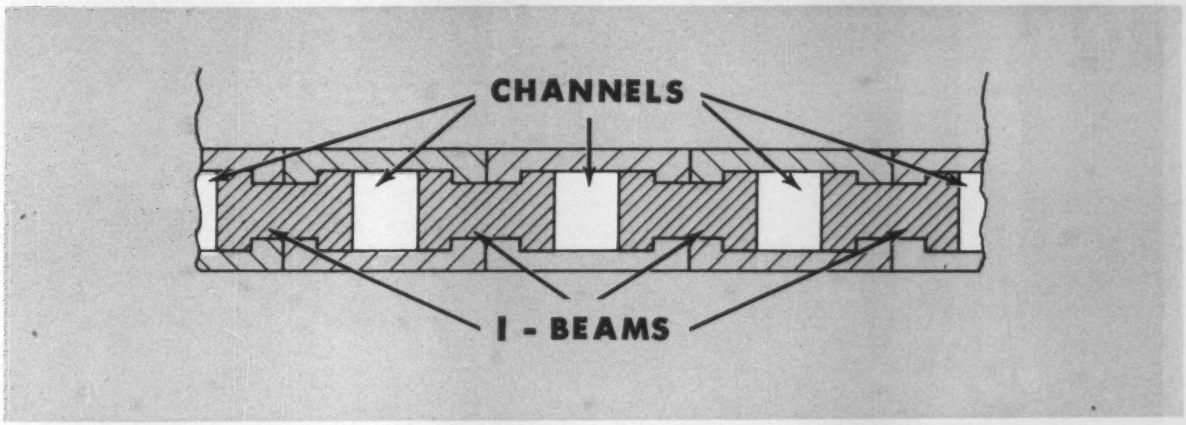
In sheet form the alloy is heat treated to yield at 180,000 psi. Cold working prior to aging raises the strength level to 300,000 psi. A temperature range of 700-750°F for 12-25 hours is used depending on the amount of cold working that's performed. The higher strength level produces a strength-to-density ratio of about 1.7×10^6 in.

Forming the tape's I-beam and channel sections offers a real chal-



TWIN BREAKTHROUGH: An ultrahigh-strength titanium alloy and a fresh approach to tape winding are results of pressure vessel study.

Titanium Tape Takes Structural Twist



lenge since dimensional control is so critical. The Turks heading method is used to cold reduce the alloy. This method offers greater sensitivity of adjustment over a shell mill, hence, better accuracy.

Two Passes—The I-beam shape is formed with two heavy passes. A kerosene-water mixture serves as both the coolant and lubricant.

Once formed, the tapes must be checked for size. Samples for test are first plated with 0.005 in. of copper, clamped, polished and photographed at 50x. The photographs are then measured.

How's It Wound?—Two sub-scale vessels were fabricated on a converted lathe. The wrapping setup, as it rolls over the mandrel assembly on the ways of the lathe, is first supported on three legs.

The setup is fitted with three equally spaced and free rotating rollers. Two shaft-mounted rollers are clamped to the frame. The third roller is mounted on an arm which is actuated by an air cylinder.

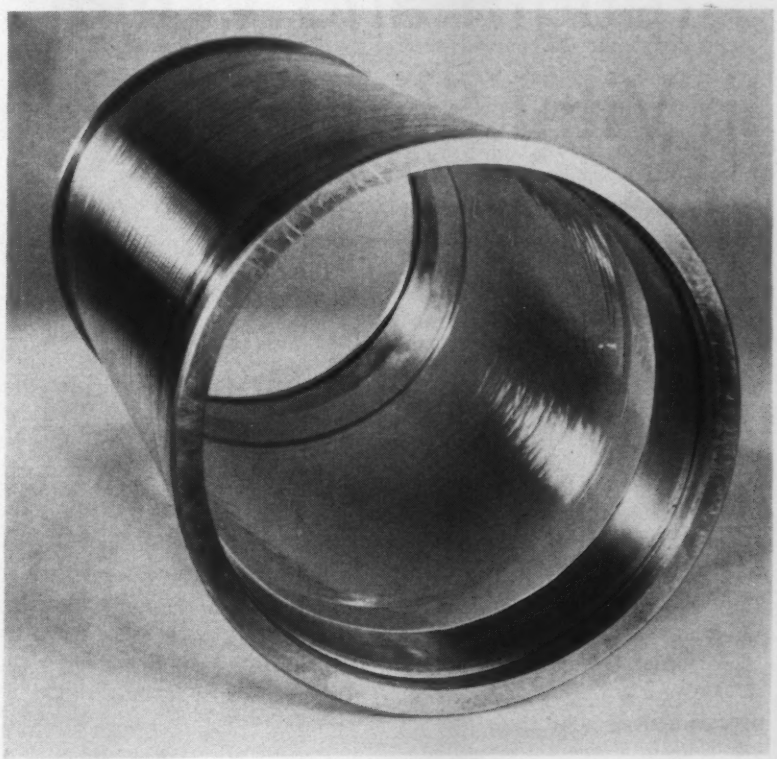
This system can apply a rolling radial force of 2500 lbs on the tape. When applying rolling force, the device lifts from its legs and centers itself on the mandrel. The roller shafts adjust axially and angularly by means of gage blocks and sine-bar devices mounted at the shaft ends.

What Do They Do?—The gage blocks and sine bar setup provide a means of tilting the rollers to the wrapping helix angle while maintaining their correct axial positions. A spring-loaded guide pushes the tape axially at the point of tangency as the tape is fed on the mandrel.

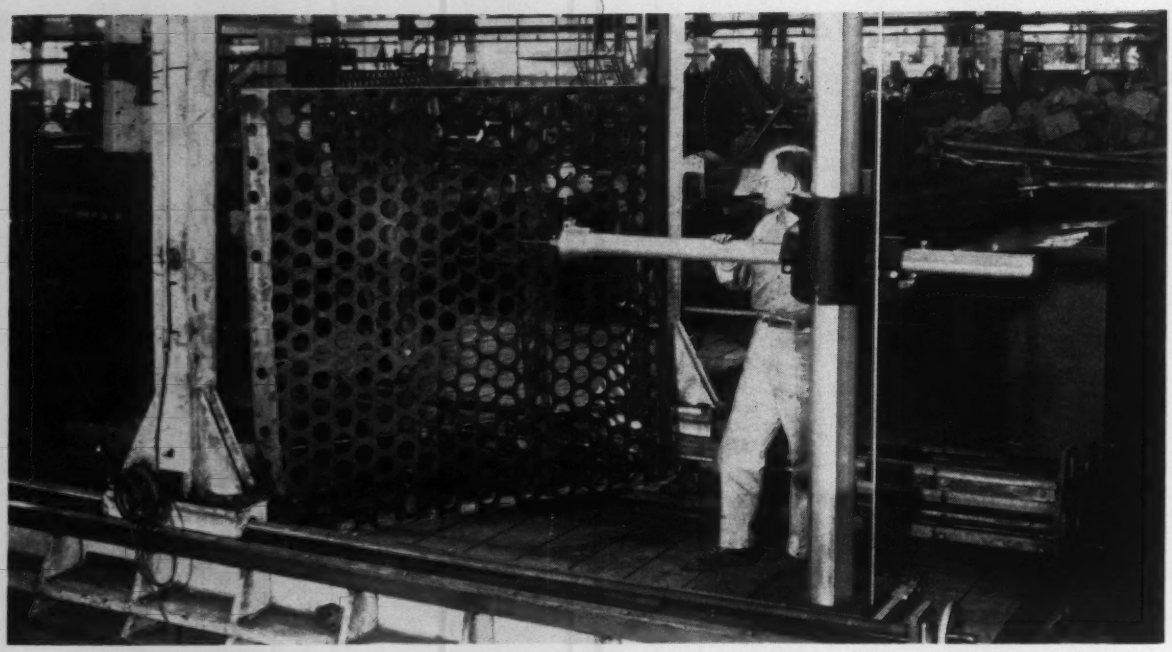
It takes three sets of rollers to wrap a vessel. Each set is formed to suit the particular tape shape.

Trial wrapping was at first attempted with spring-loaded tie rods. They pulled the head in the anti-wrapping direction with forces great enough to overcome the friction between the tape and the arbor.

The tests were unsuccessful since the rollers pulled out of the tape track. It was found that the head must be able to track freely, uninhibited by external forces.



END PRODUCT: By coating the inside of the motor with a layer of vinyl, the tape-wrapped vessel can be sealed against internal pressure.



STAMP OF APPROVAL: Specially made portage machine checked curvature on all panels to within 0.010 in.

Strength and Weight Combine In Vital Steel Structure

Many problems are involved in building the giant antennas for our radar sentinel system.

The fabricator found the solutions through proper design and gentle care.

■ Steel has been put to the test in our nation's Air Search Radar program. The giant antennas that make up the sentinel system weigh 70 tons apiece. Each antenna is supported by a 160.5-in. roller bearing atop an 85-ft concrete tower.

The order, as placed by Sperry Gyroscope Co., called for eight of these antennas. The huge task of fabricating the structures was handled by the engineering crew at Baldwin-Lima-Hamilton Corp.'s Industrial Equipment Div., Eddystone, Pa.

Three chief problems had to be solved. The first one involved proper curvature of 808 facing panels. The second problem consisted of holding correct tolerances in the support structures. Last but not least, engineers had to protect the overall structure against corrosion.

Rows of Holes—Individual panel sections were formed from 14-gage sheet. Three-inch diameter holes on 4-in. centers were perforated throughout each sheet. Then the sections were formed and supported on a box-like steel frame.

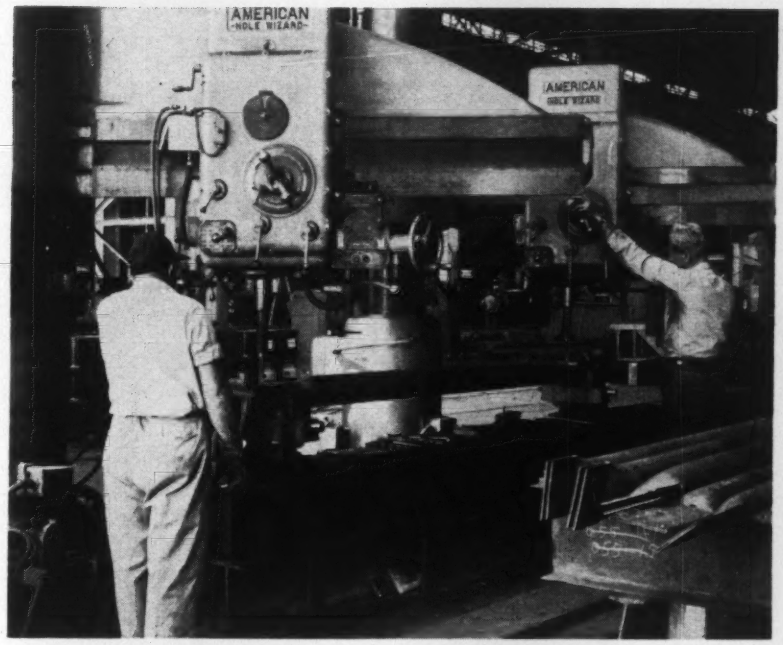
Accuracy is vital in this operation for two reasons. The installed structure must be able to "beam" transmitted impulses properly. It's also the function of the structure to establish the positions of target echoes.

The steel box frame provides both supporting strength and the needed curvature for the facing panels. Once the perforated sheet had been fitted to the frame, it was tack welded into place.

Dual Function—There are two reasons for so many holes in the sheet. First of all, it means a healthy reduction in weight. Secondly, each antenna must be able to withstand winds up to 126 mph.

The fabricator built its own portage machine to check out the panels for proper curvature. This unit gaged tolerances at 20 preset points on each panel.

Most of the strength of the an-



VENT HOLES: Radial drills and a special fixture are adjusted to drill vent holes in pipe lengths. This simplifies a subsequent galvanizing step.

tennas is provided by the supporting trusses. Some 52 sizes of seamless steel tubing were used to make up this needed pipework.

Heat and Squeeze—After the sawed-to-length pipe had been end slotted, pipe ends were heated in a small furnace. Then the end plate was put into the slot. This plate is the pedestal for mounting the antenna structure on top of the bearing.

A horizontal hydraulic press squeezed the pipe ends around the plate. This step might appear routine. However, great care was required to insure proper flattening. A pipe flattened too little or too much can affect overall length, and, therefore, its fit with other members.

The press also made a second squeeze of the pipes. This time identification was stamped on each section. In this way future errors in assembly could be avoided.

War on Rust—All pipework was galvanized. However, vent holes were drilled in all pipe members to keep them from bursting during the 975°F galvanizing bath. This precautionary step meant that the inside sections had to be galvanized also.

On the other hand, the face panels were so fragile that they would distort if heated in the bath. Then too, galvanizing would add too much weight to the panels. They would have to be painted anyway. Antennas must display white and orange markings as a safeguard against low-flying aircraft.

Tough Demands—Painting specifications were very tight. Every inch of the intricately shaped panels and box frames had to be covered. Thickness range was 6-9 mils.

Panels were therefore carried by an overhead monorail conveyor. They were lowered into four tanks for cleaning. The first tank loosened the dirt and provided a thin, phosphoric acid coating. Then came a hot water rinse, a dip in another solution and a final rinse. Forced-air drying followed.

The next steps included a wash primer and a final coat of zinc chromate. The top coat for the panels was either white or international orange enamel. Infrared lighting was used to speed the drying of the enamel coat.

This type of lighting could be used for no more than two hours at a time. Temperatures in excess of 150°F on the panel surface could damage the paint. As a result, Baldwin-Lima-Hamilton set aside one whole wing of its plant to accommodate the steady flow of panels into the paint-drying bays.

CRIMPING STEP: A bulldozer crimped ends of seamless pipe sections.

Roll Grinder Goes Automatic

Under tape control, a heavy-duty grinder matches the diameters of work or backup rolls.

Exactly-matched rolls don't require frequent regrinding.

■ Complete automation of heavy-duty grinders is now a reality. Just completed at Farrel-Birmingham's Ansonia, Conn., plant is a 60-in. tape-controlled grinder. It's slated to finish rolling-mill work rolls.

Under programmed control, the newcomer will automatically grind straight or crowned rolls up to 5 ft in diameter. One of its main uses centers on duplicating work- or backup-roll diameters.

A special numerically-addressed sequence and servo control for this grinder was developed by General Electric's Specialty Control Dept., Waynesboro, Va. This control system insures exacting tolerances.

Servo Gaging — Similar to the punched-tape controls that produce flexible automation with today's modern machine tools, the roll grinder's control system uses servo-positioned probes. These probes gage roll diameters and profiles. They also detect the work remaining to be done.

Due to inherent features of the Farrel-Birmingham machine, it isn't necessary to numerically position the grinding wheel itself. The nature of the work contributes to the ease of control.

Operating from standard 1-in. punched tape, the automatic control directs the grinder through a complete cycle. During this cycle, the machine performs all operations needed to finish or refinish a roll.

Let it Fly — After the operator starts the grinding wheel, all he has to do is push a cycle-start button. Under programmed control, the machine completes all work. It automatically aligns the workpiece. Then it performs grinding operations.

During this work cycle, the grinding wheel is automatically dressed. To wrap things up, the control system gages finished roll sizes and prints outs recorded data.

In all, the control actuates seventeen distinct machine- and control-operation sequences as primary functions. It orders four other sequences as secondary functions. And it selects any of ten speeds for the machine's headstock, carriage, grinding wheel, step infeeds and continuous infeed rates.

Perfect Match — The automatic control can match the diameters of paired mill-stand rolls, regardless of original diameters or uneven wear. This is a must in precision metal-rolling mills.

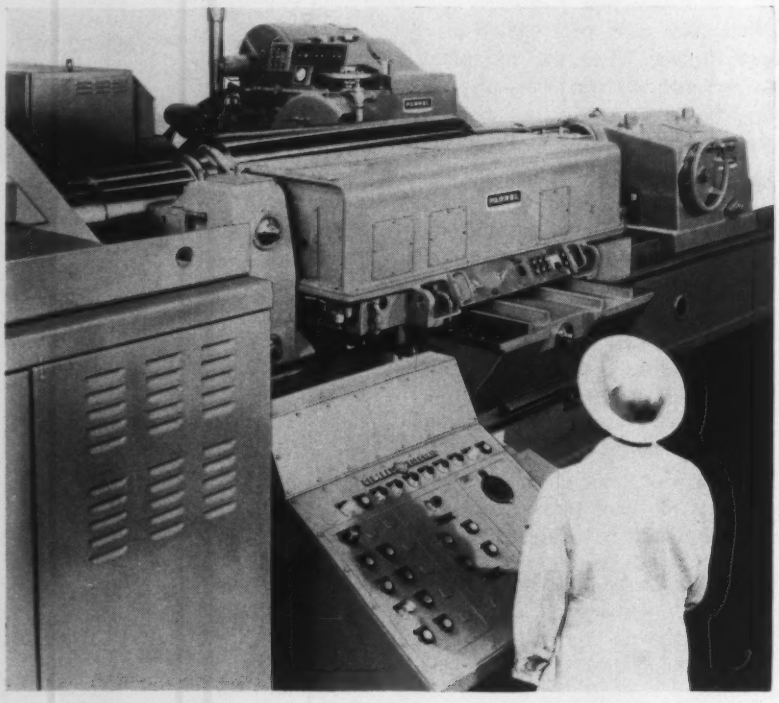
Here's how the automated grinder matches work roll roundness-and-profile tolerances. Through the sophisticated control, hardened-steel probes scan each roll to find the points of greatest wear. The control sets these points as "bench marks" for rough grinding.

In addition, the control memorizes the finished diameter of the first roll in a stand-to-stand setup. Then it matches the memorized size to the mating rolls. This check is made positive by probing actual work surfaces. Grinding-wheel positions don't need to be gaged.

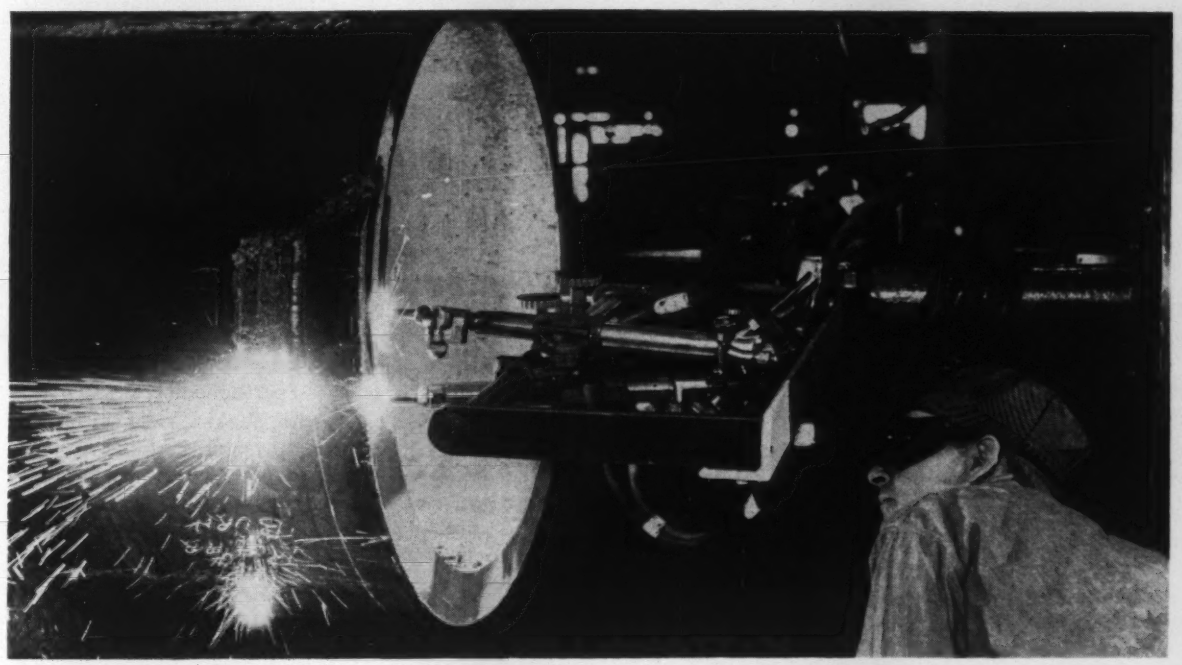
Fine Feeds—A trunnion-tilt infeed positions the grinding wheel against the work. This infeed eliminates friction and "slip-stick" effects. It's the secret behind ultra-fine 0.0001-in. feed increments.

The feeding device is always preloaded in one direction. This insures extreme accuracy during the positive infeed and subsequent withdrawal of the wheel.

Better-matched rolls will produce more uniform strip in all metal-rolling operations. Uniform diameters also increase the service life of every pair of matched rolls.



PROGRAMMED GRINDING: Uniform diameters roll smoother strip.



SCORCHING BLAST: Rotary-torch machine carves a taper through a drum shell used to generate steam.

Torch Burns Up Forming Costs

Machining away 4-5 in. of steel from each end of a large cylinder takes lots of time.

An engineer's blunt comment on this operation led to time- and money-saving changes.

■ In this complex age, it's easy to overlook the straightforward way of doing things. But often, a simple, direct method proves best. A good engineer understands this.

Take the case of the steam-boiler drums. In preparing cylinders to make up these units, Foster Wheeler Corp., New York, had to cut off the cylinder ends. This shapes up the cylinders so that elliptical drum ends can be welded on. To do this, the company used a lathe and a boring mill. It was an elaborate, but conventional way.

Straight Talk—However, during a periodic review of their operations, company engineers took a good hard look at their forming procedure. The upshot went something like this: "Let's face it, all we're doing is cutting the ends off the thing. Why don't we use a torch?" This pithy summary speeds to the mark. Why not indeed? It's the simple way. It also proves to be a better way.

Foster Wheeler revamped its operation. As a result, welding preparation costs nose-dived 45 pct. Key to the savings was the torch-cutting idea. But before the new method was a reality, more engineering came into play.

Simple methods can pay off, but why be archaic? Good basic ideas usually benefit from refinements. So designers went to work on a torch-cutting machine, tailored to this work. When they were through, they had a versatile unit.

The Result—From a Ransome #10 Positioner, a rotary torch-cutting machine evolved. The unit teams up divergent, high-speed oxygen nozzles with oxy-propane cutting tips. Fuel-gas and oxygen headers feed these torch assemblies. In all, there are two machine-cutting torches and a hand torch. These train on the cutting line as they rotate around the work piece.

An adjustable torch-bar fixture consists of screw counterweight, a personnel shield and a pointer that aims the oxygen cutter. This whole assembly bolts to the positioner face plate. The positioner swivels and locks on a mast.

On the Job—In operation, company men lay out the cylinder, leaving ¼ in. at each end for final machining of a weld groove. Then they mount the cylinder on vee blocks and burn off the excess steel. One operator can lay out inside and outside tapers and cut them both at the same time.

How about results? Foster Wheeler reports the quality of burned surfaces as excellent. Just a slight wire brushing cleans away scale left after slag removal.

Plastic Resins Seal Castings To Take High Pressures

Foundries are taking a close look at plastic impregnants. Results appear very promising.

Without solvents, one plastic composition converts to a 100 pct infusible-solid seal.

■ Faced with rising costs and a growing demand for more precision in casting complex shapes, many foundries are adapting plastic-sealing methods. These methods allow cast-metal parts to meet ever-soaring reliability levels. They also serve as production quality controls.

The use of sealants is a must in most foundries. Both ferrous and nonferrous castings usually have invisible capillaries and tiny pores. These minute voids open the door to in-service leakage and pressure losses whenever the castings are employed in gas, liquid-pressure or vacuum systems.

Nonferrous castings are especially hard to make without void formations. Even under the best foundry conditions, voids often crop up.

War-Time Start — Casting impregnation first became popular during World War II. During this period, impregnators were used chiefly to save rejects. Later, impregnation became a vital foundry tool in upgrading all types of castings.

Typical of the impregnation operations now found in the industry are those performed by Casting Impregnators, Skokie, Ill. One of the company's major applications involves powdered-metal castings which are about 85 pct dense.

These parts are formed in a sintering setup. Before they can be plated, all voids must be filled. A plastic sealant prevents acids from entering the pores. It also precludes bleeding after plating.

Diallyl-phthalate (DAP) polyesters, a product of the Food Machin-

RESIST HIGH PRESSURE: An engineer inspects and logs a few of the plastic-impregnated castings.

ery and Chemical Corp., New York, serve as the sealant for this work. They boast low volatility, a high-flash point—350°F constant service, 400°F intermittent—and long storage and tank life.

Stain Free—Although their performance is similar to that of styrene polyesters, the DAP types don't boil away or produce sharp odors. The treatment leaves no surface stain or film after cleaning. And it doesn't interfere with painting or anodizing.

Impregnating operations at Casting Impregnators consist of five basic steps. First, the castings are degreased to remove foreign matter. Then they're inserted in a pressure tank where all air is drawn off.

The third step centers on impregnant injection. It takes place as the plastic sealant is introduced into the pressure vessel.

Next, the impregnant and the castings are subjected to high pressure. This pressure forces the sealant into all minute voids. Washing and baking cure the trapped resins to insure leak-proof castings.

Many Uses—Plastic impregnation proves most advantageous for parts where leakage can't be tolerated. These parts include: Filter housings, valves and casings, gland seals, solid-valve parts, cylinder liners and even torpedo housings.

Manufacturers of automotive equipment use the plastic sealants for both aluminum and magnesium castings. These impregnated castings serve as diesel- and gasoline-engine blocks, cylinder heads, carburetor- and fuel-pump components and power-transmission parts.

Aircraft Service—In the aircraft industry, all castings subjected to in-use pressures above 100 psi are impregnated to insure a "margin of tightness."

Some aircraft fuel-control systems operate under pressures of 1400-2000 psi. The dependability of these high-pressure systems hinges on the plastic sealants.

Other aircraft-casting applications include: Hydraulic systems for brakes, landing gears and flight controls; reciprocating engine blocks that use cored passages for lubricants; cabin-supercharger systems; various instruments that have hydraulic controls; and many other cast parts for pressure service.

QUICK DIP: After degreasing, the cast parts are washed off in a mild solution of trisodium phosphate. This removes all surface residues.

FORCE FITS: Pressure of 125 psi forces the plastic resins into invisible capillaries and tiny pores. Then the parts soak for 30 minutes.

Limitations — In sealing structurally-sound castings, the plastic impregnants provide a high degree of efficiency and permanence. Normally, impregnation is carried out after final machining. It isn't recommended for castings that contain cracks, gross porosity or blowholes.

Major savings in both time and money are realized with the new method. It's easy to use the plastic impregnants to seal costly machined castings. Machining tends to open up blind capillaries and other voids. This is why you should impregnate after final shaping is completed.

High-Speed Welder Tames Production Problems

Practical versatility is one good way to sum up the advantages of high-frequency resistance welding.

It's active on many fronts, mostly on the production line.

▫ Just a few short years ago an unusual welding process made its debut on the metalworking scene. It was called high-frequency resistance welding. How has this process been received by industry?

The latest report from the manufacturer of this equipment reveals that over 150 units have been installed throughout the world. Most of these machines are also knee-deep in production work.

New uses are being uncovered almost daily. The process is active throughout the entire metalworking spectrum. Hard-to-weld metals and intricately-shaped alloys are the kinds of problems that high-frequency welding thrives on.

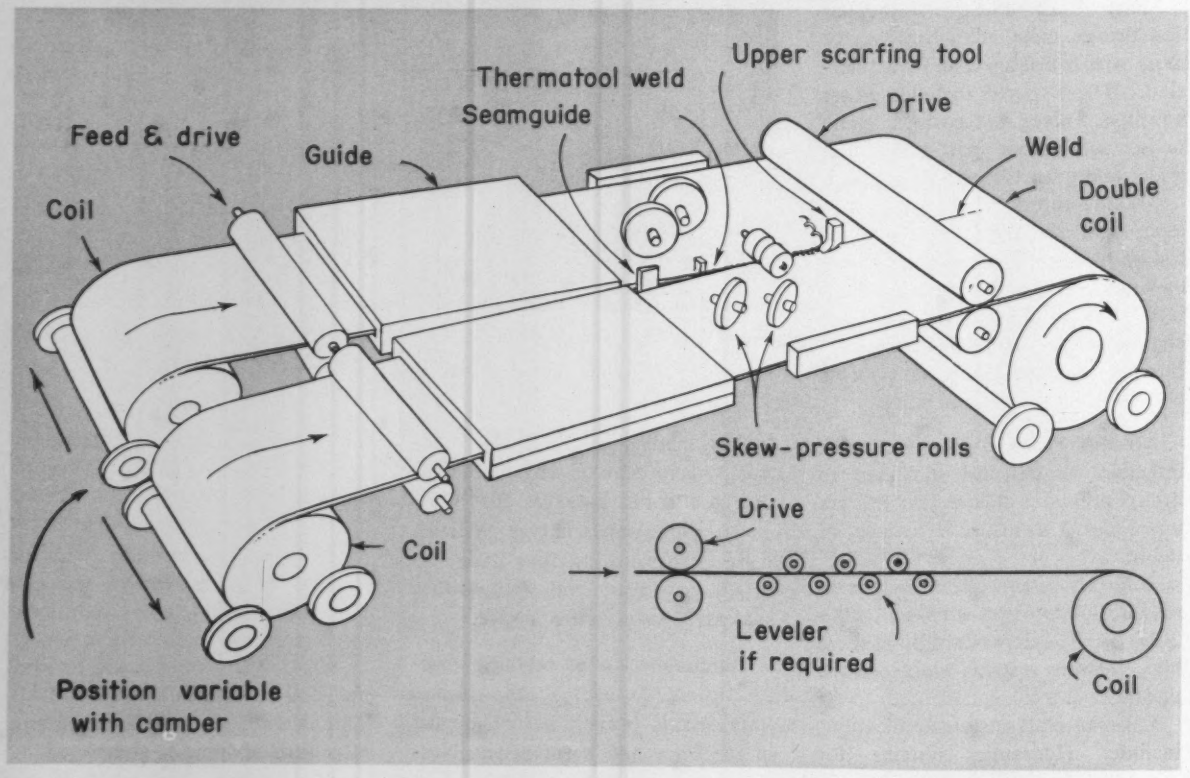
A key to its quick acceptance is the versatility of the method. Ferrous and nonferrous metals are being welded interchangeably with the process.

Single Head — Using the same welding head, the method can switch from one tough job to another with little delay. One minute it will be welding high-speed steel to high-carbon steel. The next minute it might be joining copper to steel.

According to the equipment builders, New Rochelle Thermatool Corp., New Rochelle, N.Y., they have yet to find the metal or alloy that the process won't weld. This includes 100 pct conductivity copper, the rarer metals like zirconium and the newer heat-resistant alloys so widely used in space vehicles.

Thin metal of 0.004 in. can be lapped or mash-lapped with a forge weld at speeds up to 1000 fpm. The method, however, is certainly not limited to foil thickness. Here's proof of that. The Thermatool process can weld ⅝-in. thick steel, either cold- or hot-rolled, at speeds

Welder Produces Extra-Wide Coils



up to 50 fpm. This steel still has scale on it.

War Against the Impossible—Odd shapes present few barriers to the process. Rolling mills cannot produce box beams, but high-frequency resistance welding can. The welder itself is easily adapted to continuous forming mills, press brakes, draw benches or automatic equipment.

Several leading laboratories have conducted metallurgical tests on the welds. These tests prove that at 400,000-450,000 cps heat is concentrated on the actual edges of the metal being welded. There's very little distortion in the surrounding metal.

Two contacts introduce the high-frequency current right into the metal. The contacts slide on the metal and are attached to self-adjusting elements which, in turn, accommodate the surface of contacts to the edges of the metal being welded.

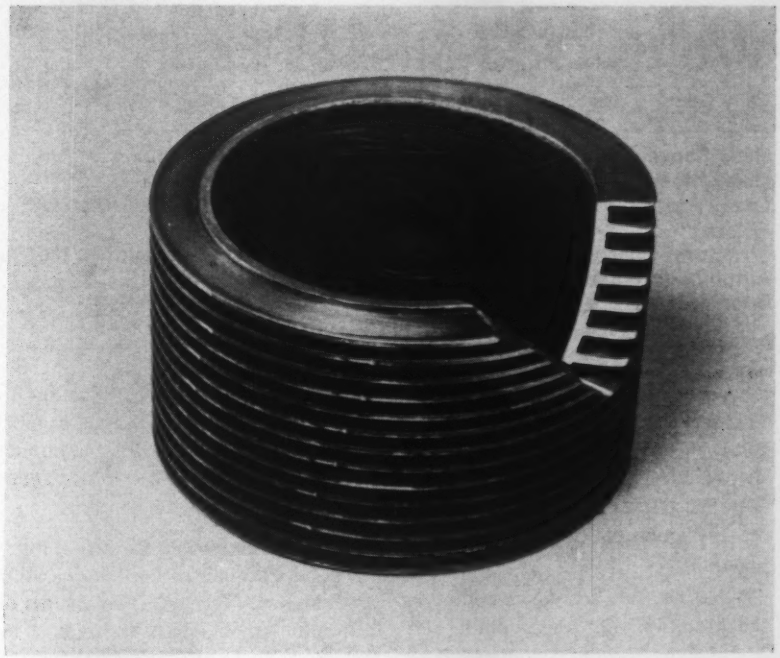
Spirally-Welded Tubing — New Rochelle Thermatool Corp. has already developed and is building a system whereby pipe and tubing can be spirally welded at high speeds. Its latest venture is a radically-designed forming mill.

The mill which produces 6⅝-in. diam spirally-welded tubing isn't much bigger than an office desk. The process also lends itself to the production of rocket and missile casings with stiff walls.

There are times when blow-out strength is not a consideration. When this is the case, it's quite possible to decrease the wall thickness of the tubing. This can be done because of the stiffness the tube receives from the spiral weld.

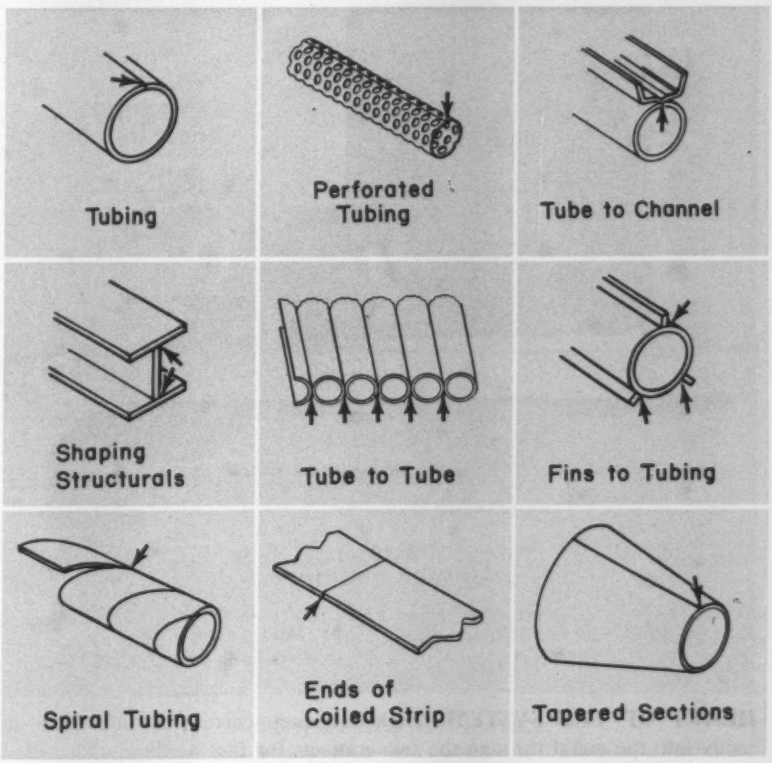
Case Histories—Once again, the process is not restricted to just the welding of infinite lengths of tubing, pipe or strip-to-strip at various angles. Study the following list of applications. Flat strip or inverted channels are being welded to tubing. Corners of square or rectangular tubing can also be joined at high speeds.

Aircraft builders have even put



QUICK JOINING: The high-speed method can join ½-in. spiral fin to 4-in. steel pipe at 60 fpm. It also joins different diameter tubes. Advantages include: Low reject rates, quality products and versatility.

Process Thrives on Variety



Welds Odd Shapes Easily

END USE	WELD CONFIGURATIONS
Heat Convection	Spiral Fins on Tubular Forms
Drum Heads	Sealing of Lips or Edges
Lamp Posts	Tapered Tubes of Heavy-Gage Metals
Filters	Perforated Strip Metal
Structural Shapes	Box Beams of Same or Dissimilar Metals
Automobile Wheel Rims	Butt-welded Sections
Door Frames	Channels Butt-welded at Angles

the process to work in joining odd "T" sections, both straight and angular. Channels have been formed by welding two strips together. Another trick is producing a channel by joining two angle strips together.

One use in heat convection is the addition of longitudinal fins or ribs on tubing or strip. Two tubes were also welded together to provide a heating tube that insured a continuous flow of viscous liquids in the basic tube. The welded tubes had different diameters, too.

Little Plants Get Bigger—Here's a good example of continuous strip welding. By joining two strips of infinite length, strip width can be increased. This approach offers a way in which limited-size mills can produce strip in widths of more than 36 in. when the customer specifies 48 in. or more in width.

Joining two strips continuously by standard methods is a laborious, time-consuming and costly job. The Thermatool process will not only solve this problem but it will record end results in feet rather than in inches per minute.

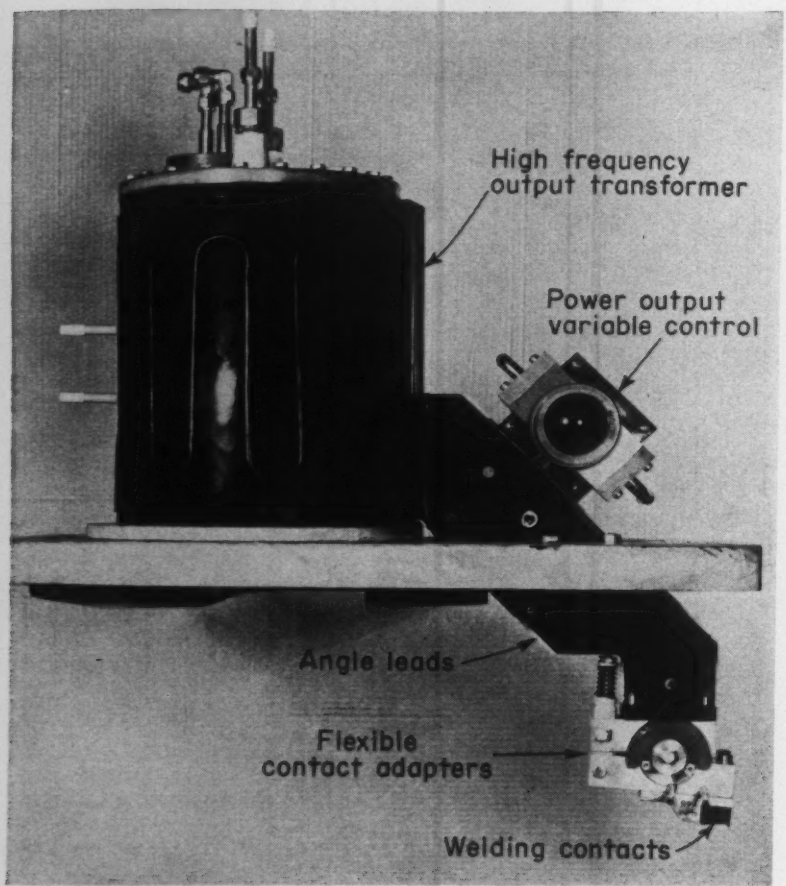
Other examples are a tube of pipe welded to a flat strip, a channel or an inverted channel. To build a furnace wall, you can weld up a series of tubes to suit the purpose well.

Efficient Energy—Of course, the process succeeds because it makes the most efficient use of electrical energy for the production of weld seams. In order to obtain this result, the electrical energy, with its subsequent conversion to heat, is concentrated solely on the shallow faces of the metals being welded.

Since almost all of the heat energy is confined to the weld zone, the heat-affected area adjoining the weld is seldom changed metallurgically. The energy needs for a given welding speed are reduced proportionately. To express this point in another way, the speed of welding can be increased many times for a given energy consumption.

Users of the Thermatool process report that great savings can be realized. They tick off such points as faster production, quality products, low reject rates in materials and versatility through the single welding head.

On this welding process, the current reverses at 450,000 cps and follows the low-inductance rather than the low-resistance path. This produces a skin effect with localized heating of very high intensity. Such an approach lends itself to lap, mash-lap and butt welding.



HEART OF THE SYSTEM: High-frequency current is introduced directly into the metal through the two contacts for fast welding.

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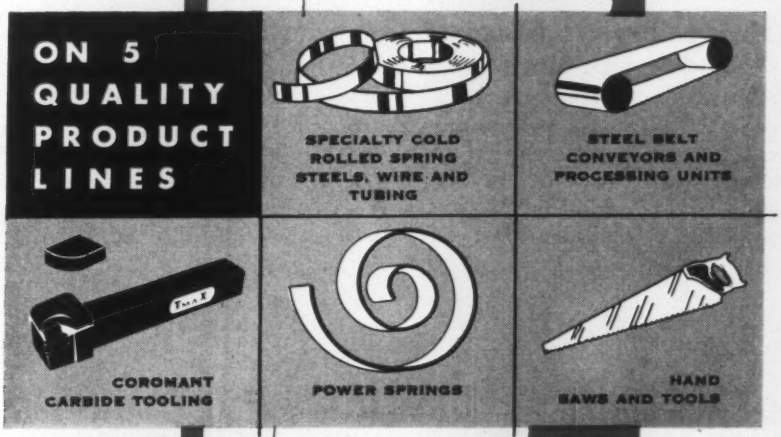
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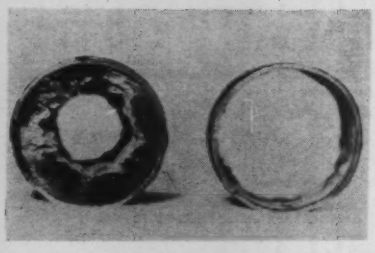
New Materials and Components



Non-Toxic Cleaner Disintegrates Boiler Scale

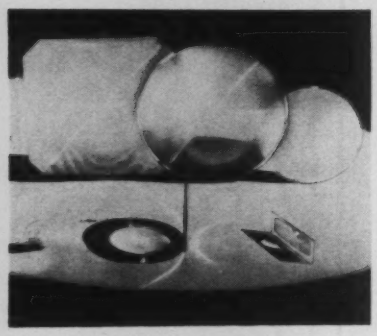
A remarkable new cleaning agent packs the power to disperse boiler and mill scale. But it's gentle enough to double as a dentrifice. Odorless, non-toxic and soluble in water, the compound comes in liquid form. No special precautions are necessary in shipping, storing or during use. When it's clean-up time, rinsing with water arrests all action. As a result, you can dispense with acid neutralizers and acid-resisting equipment. (Chemico)

For more data circle No. 19 on postcard, p. 117

Coating Material Passes Rugged Navy Trial

Results of a year-long test by the Navy prove the resistance of a coal-tar, poly-epoxy coating. It withstands severe saline and atmospheric attack. In the test, a pontoon got two cold-roller applications of the new coating. Then it was left exposed on a dock for four months. Inspectors found coating and metal unscathed. In test-phase two, the pontoon was immersed in salt water. After eight months of this treatment, it was removed from Narragansett Bay. Underneath the barnacles, the coating was perfect. Once again, the metal showed no ill effects. (Koppers Co., Inc.)

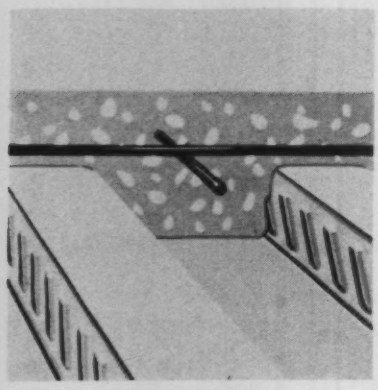
For more data circle No. 20 on postcard, p. 117



Optical-Plastic Lenses Boast Extreme Toughness

These thin sheets of transparent plastic look like phonograph records, except that the "grooves" extend from the very center to the margin. There, however, the similarity ends. Each groove is actually a minute refracting facet of a circular prism. The grooves form a multitude of tiny optical elements. These bend light in a variety of ways. Although the facets act like ordinary lenses in principle, there are some big advantages. For instance, it's possible to correct the new lenses for spherical aberration. They're also very tough. They can be cut, turned, drilled, sawed, machined and cemented to a support. (Stocker & Yale, Inc.)

For more data circle No. 21 on postcard, p. 117



Steel-Floor Deck Upgrades Concrete Construction

Reinforced-concrete construction isn't exactly a newcomer. But there's always room for improvement. A recent development in this field is steel-floor deck that provides reinforcement without bars. At the same time, it serves as a permanent form. Because separate bars, forms and shoring aren't needed, the system's cost is right in line with traditional methods. Steel decking goes in fast and acts as a working platform. This eliminates the usual shoring operations, both before and after the concrete work. Reinforcement strength results from raised lugs that are formed into the panel webs during a rolling process. In this age of fast-paced construction, time means money. Steel-floor deck may save you some of both. It slashes job time; ups profits. (Inland Steel Products Co.)

For more data circle No. 22 on postcard, p. 117

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Moline Iron Works, Moline
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Peoria Malleable Castings Co., Peoria 1
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Mississippi Malleable Iron Co., Meridian

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Frazer & Jones Company Division The Eastern Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Castings Co., Cleveland 6

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Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
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Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

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DESIGN DIGEST

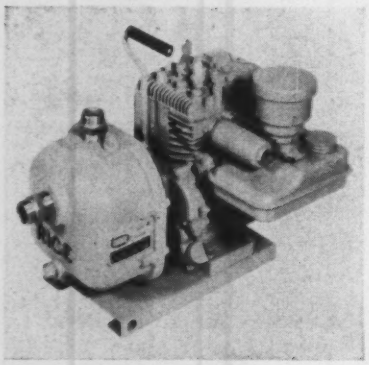
Ups Joint Strength

New tubing for deep wells and multiple completions meets the increasing requirements of today's oil industry. It features an Acme thread design that yields maximum clearance with joint strengths well above yield strength of the tubing body. To do this, standard Acme dimensions have been reduced in a 4:3 ratio. These threads are run out completely, extending on a constant taper to the tubing's OD surface. This increase in the number of threads adds strength and leak resistance. (Pittsburgh Steel Co.)

For more data circle No. 23 on postcard, p. 117

Self-Priming Pumps

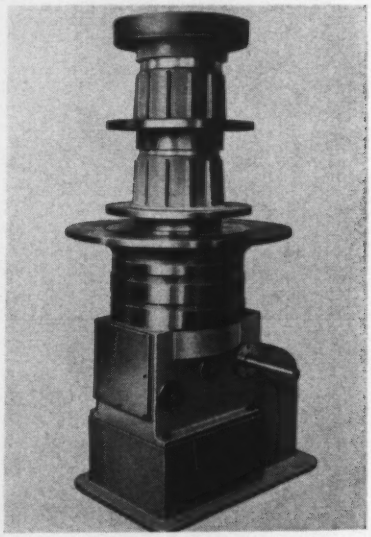
Models in a line of light pick-up pumps come with ¾- and 1-in. openings on both suction and discharge ends. In all, there are 10 models from which contractors and other users can select the best type and size. Power options include gas engines, electric motors, belt drives or just plain flexible couplings. Regardless of the power combination, all pumps are of the self-priming type. Wearing parts, such as volute, impeller and mechanical shaft are readily replaceable in the field at low cost. (Rice Pump & Machine Co.)



For more data circle No. 24 on postcard, p. 117

Turret-Machine Chassis

Using the dual-motion method of multiple piece-part assembly, a new self-contained, turret-indexing chassis offers several important advantages. These include: Positive parts control, reduced jamming potential, simplicity, ease of tooling and standardization. The machine chassis particularly suits high-speed, light-sequential assembly and processing. A major portion of the tooling mounts on, and is actuated by, a pair of tool plates. These plates move up and down with a definite relative motion. Cams synchronize the motion. Thus, work transfer and tool actuation are mechanically timed and interlocked. (Swanson-Erie Corp.)



For more data circle No. 25 on postcard, p. 117

Signals Pressures

Electrical switches, which signal pressures and differential pressures, have recently been developed. The new units operate by means of a

Post-Forming: New Way to Bigger Savings with Malleable Castings

The ductility of Malleable iron castings permits use of high-speed forming techniques to finish Malleable parts at lower cost. Take advantage of the versatility you get only with ferritic and pearlitic Malleable castings. For a fuller understanding of how Malleable can help you, call any producer that displays this symbol —

Free Folder describing these techniques is available for your use. Just ask any member of the Malleable Castings Council for Data Unit No. 116, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

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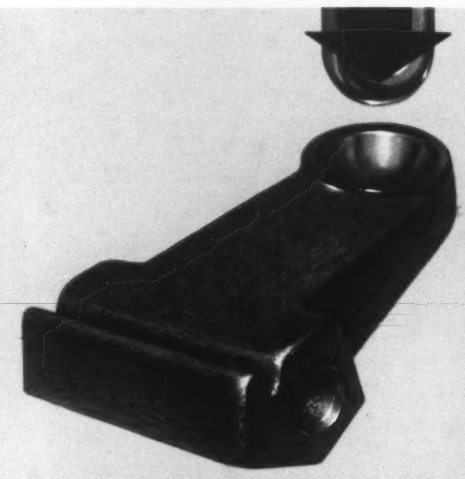
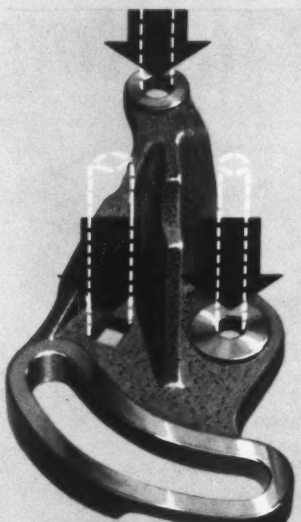
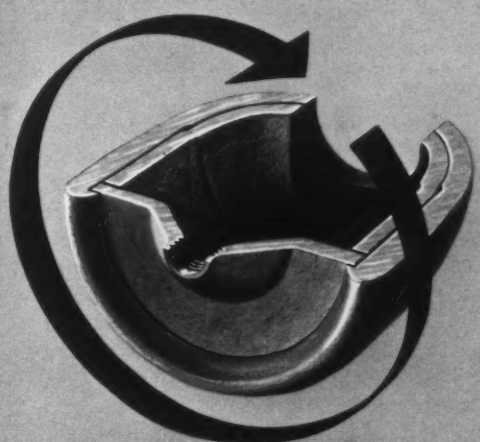


Hot Form It — Hot coining this Malleable transmission part reduces finished cost . . . eliminates three cutting operations required by the previously used steel part.

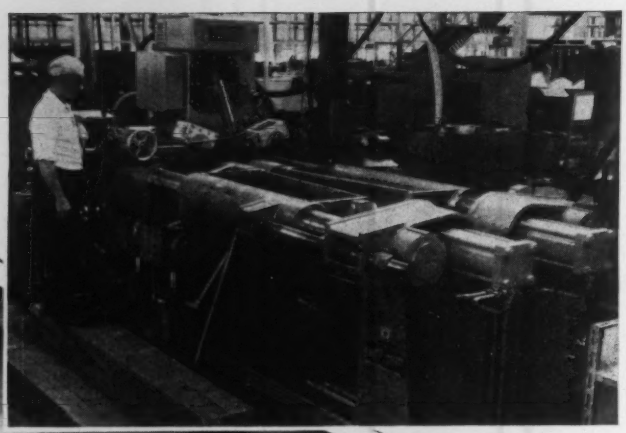
Roll It — Oil grooves in lawnmower crankshafts and splines in compressor crankshafts are just two of many places where rolling proves more economical than machining.



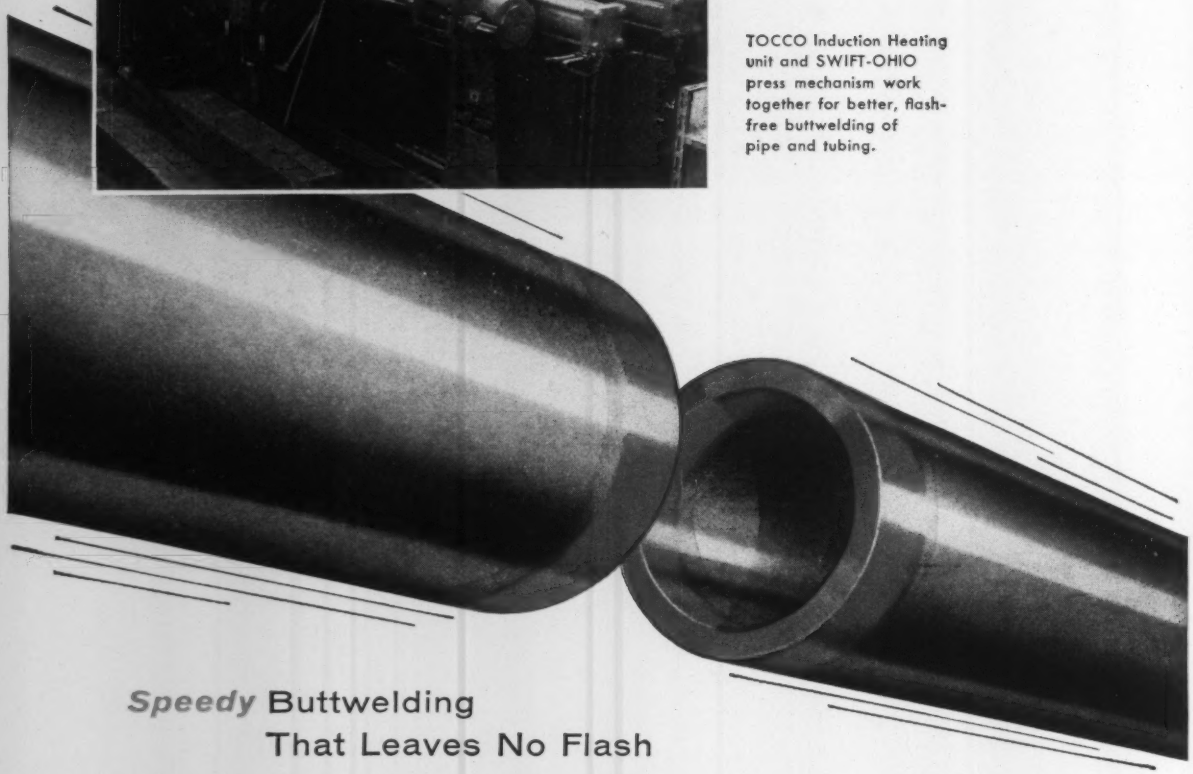
Punch It — Holes with diameters greater than the thickness of the metal can be punched in Malleable. Two round holes and a square hole are punched simultaneously in this idler arm.



Spin It — Malleable's ductility permits the sleeve and end disc in this ball joint to be held in place by spinning the Malleable housing into a strong, permanent flange.



TOCCO Induction Heating unit and SWIFT-OHIO press mechanism work together for better, flash-free buttwelding of pipe and tubing.



Speedy Buttwelding That Leaves No Flash

with TOCCO Induction Heating*

Now, in less than a minute you can get flash-free, smooth joints on any size pipe, regardless of its diameter or wall thickness.

Conventional buttwelding methods produce strong, sound joints but leave a brittle flash inside or outside the pipe. Inside flash can seriously impede fluid flow. Particularly on long lengths of pipe, removal of this inside flash is a real production headache—time consuming and expensive.

Whether *your* production bottleneck involves buttwelding, soldering, brazing, heat treating or forging, it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

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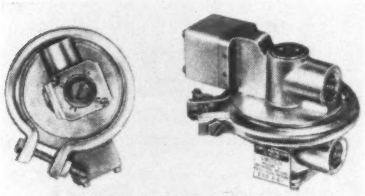
spring-biased diaphragm. This diaphragm senses very low pressures. At a preselected point, it actuates a



rod which triggers a switch mechanism. Actuation pressure is set on a direct-reading dial. The units contain no mechanical linkages and they are safe up to their rated capacity of 250 psi. (Pall Corp.)

For more data circle No. 26 on postcard, p. 117

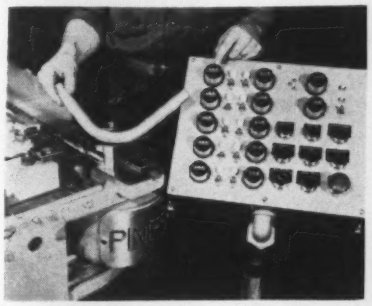
High-Grade Insulation

Continuous glass-epoxy laminates are now available in slit coils or fabricated parts. The material boasts good electrical properties, moisture and chemical resistance, and a high strength-to-weight ratio. It's expected to find many uses in motors, transformers and in similar devices where high-temperature insulation is a must. (Spaulding Fibre Co., Inc.)

For more data circle No. 27 on postcard, p. 117

Bend-Angle Selector

More-profitable handling of bending operations requiring frequent setups results from the use of a new electronic angle-of-bend selector. Even an untrained operator is



able to program bend angles from blueprint specs or records of previous setups. The selector matches electrical impulses from signal potentiometers. These potentiometers

All of these shares having been sold, this announcement appears as a matter of record only.

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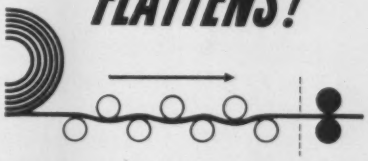
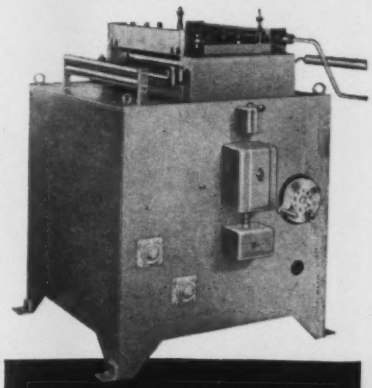


reduces CURL, CAMBER, etc!



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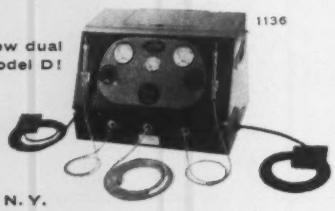


1136

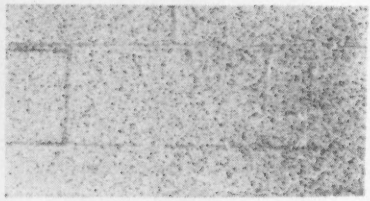
S. S. White Industrial Division
Dept. 32-A, 10 East 40th Street, New York 16, N. Y.

are set to produce the desired degree of bend. When the swinging arm of the bending press rotates to the proper angle, the control matches the dial setting. This stops the bending arm, terminating the bend. (Pines Engineering Co., Inc.)

For more data circle No. 28 on postcard, p. 117

Ceramic-Type Finish

Here's a new, heavy-duty resin compound that eliminates continuous repainting of porous surfaces. It's sanitary, economical, decorative, and it dries to a permanent, high-gloss finish. The compound smooths out non-uniform masonry backings in one application. Large areas may be bridged by using fiberglass cloth. But that's not all; the coating is easy to apply with brush,



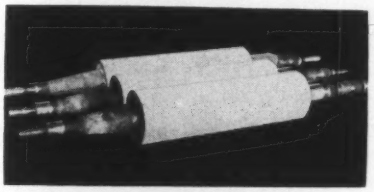
roller, spray, squeegee or trowel. It's recommended for industrial, commercial and marine applications where surfaces are deteriorating due to corrosive action or abrasion. (George E. Fines, Inc.)

For more data circle No. 29 on postcard, p. 117

Boosts Roller Life

Developed to eliminate pick-up problems, a new type of coating for annealing-furnace rolls produces long service life before refinishing. The extremely-hard coating is applied at temperatures near 15,000°F. Although it's relatively thin, the coating is not affected by this extreme temperature. According to the manufacturer, the new type of roll was developed to resolve a pick-up problem common in the annealing of silicon strip. When the furnace-roll material has an affinity for strip being processed, the roll tends to pick up spikes. These spikes cause indentations in the strip. Thus, periodic reworking is

necessary to get rid of the spikes. However, rolls treated with the new

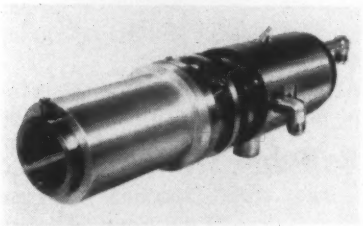


coating last several months without refinishing. (The Duraloy Co.)

For more data circle No. 30 on postcard, p. 117

Mixing Attachments

Two new modular-mixing attachments for a 300-kw, arc-plasma

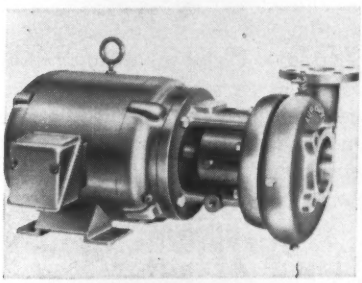


generator make their debut. According to company officials, the newcomers create environments for reentry testing of materials, heat transfer and gas dynamic evaluations. Other uses are chemical-synthesis investigations, magneto-hydrodynamics studies and jet-thrust research. As the plasma stream leaves the mixing chamber, it's compressed at the constricted chamber throat. Then it enters one of the new nozzle modules. Depending on which nozzle is used, either super- or subsonic flows may be achieved. (Plasmadyne Corp.)

For more data circle No. 31 on postcard, p. 117

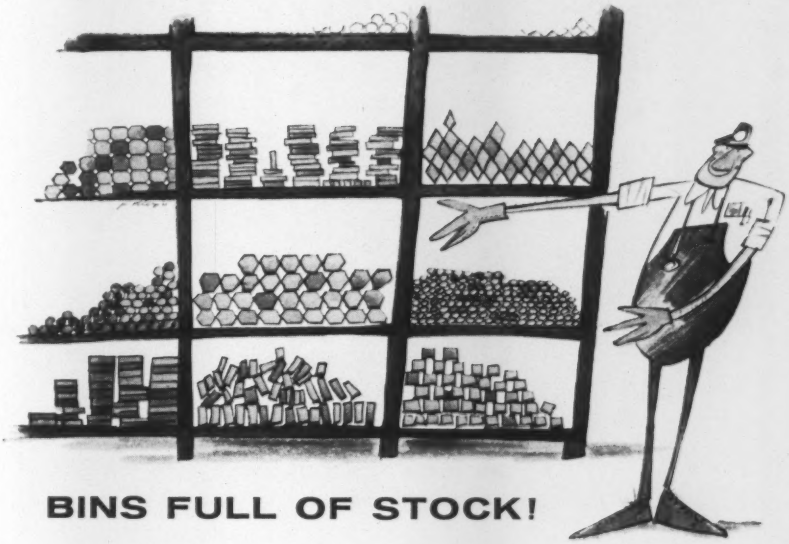
End-Suction Pumps

Especially designed for high efficiency and practical economy, new



close-coupled, end-suction pumps slash initial investment and operat-

BEANS FULL OF KNOWLEDGE...



BINS FULL OF STOCK!

If you use alloy steels in your operations, you will find Wheelock, Lovejoy a most useful ally. W-L offers you complete servicing of your alloy steel needs. There are seven strategically-located W-L warehouses, each of which is fully staffed by veteran metallurgists, ready to give you expert advice as to grades, applications, heat treating, etc.

Each W-L warehouse maintains complete stocks of alloy steels, including standard AISI and SAE steels, and our own HY-TEN steels, which offer advanced metallurgical features at competitive prices.

With Wheelock, Lovejoy, you merely order the steel you need—as you need it—in specified sizes, shapes, grades and treatments.

For service that's complete, and completely satisfactory, call the W-L branch nearest you.

W-L STEEL SERVICE CENTERS – Cambridge • Cleveland Chicago • Hillside, N. J. • Detroit • Buffalo • Cincinnati

AGENTS – Southern Engineering Company, Charlotte, N. C.; Sanderson-Newbould, Ltd., Montreal & Toronto

"The Alloy Steel Center"

WHEELOCK, LOVEJOY & COMPANY, INC.

130 Sidney St., Cambridge 39, Mass.

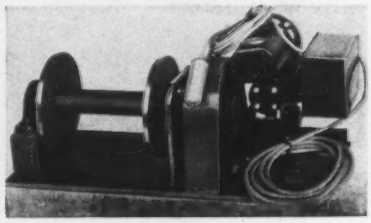
STEEL SERVICE CENTER INSTITUTE

ing costs. Capacities range to 1600 gpm and heads to 30 ft. But the advanced design holds size to a minimum; keeps horsepower down. In addition, fast installation makes these pumps ideal for air-conditioning systems, cooling towers, boiler feed and condenser circulation. Since parts are standard and interchangeable, upkeep on multiple installations is vastly simplified. (Aurora Pump Div., The New York Air Brake Co.)

For more data circle No. 32 on postcard, p. 117

Portable Winch-Hoist

A new portable, electric winch-hoist boasts a single-line pull of 4000 lb. But it's only 13x21½x11 in. in size, and weighs just 160 lb. A 110-v, single-phase motor supplies the power. Free-load speed is 15 rpm. The winch comes with 15-ft of cable, equipped with a heavy-duty plug. Its 10-ft, remote-

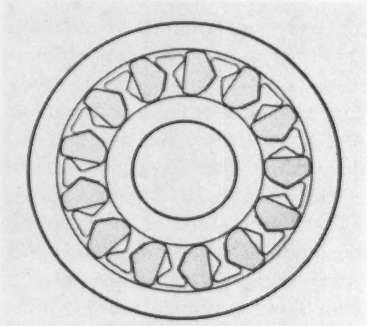


control cable uses a forward-and-reverse switch. Other features include stress-proof shafts and roller bearings sealed in oil. There's also a positive worm and worm gear, and a separate transformer for the control switch. (City Engineering Co., Inc.)

For more data circle No. 33 on postcard, p. 117

Reliable Clutches

The cross-sectional diagram shows the arrangement of separately-contoured, individual leaf springs in a new sprag-type clutch. Individual control of sprag ener-



gizing lets the new units meet the high-performance over-running and indexing requirements of modern miniature mechanisms. They are designed to operate at continuous over-running speeds up to 3450 rpm, and to index at rates of from 6000-7000 cycles per minute. Applications are seen in missiles, servo mechanisms, precision instruments and small business machines. (The Formsprag Co.)

For more data circle No. 34 on postcard, p. 117

Linear Actuator

Designed to deliver a long uniform stroke, a new electro-mechani-

from the makers of
MILWAUKEE WROT WASHERS

In this difficult economy, nobody has time for sales gimmicks or jests. So this is neither. We simply want to *prove* to you, Mr. PA, and to your cohorts in Administration, Engineering and Production, that *Milwaukee Wrot Washers* are your best buy.

Washers are important products . . . particularly when unusual types, produced to precise standards, are wanted "yesterday" for important jobs. *This is our proposal:* Next time you run into a REAL PROBLEM with washers or fasteners, get in touch with us. Bet you we can solve it, pronto. You be the judge!

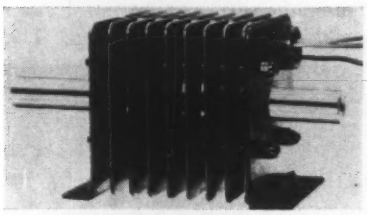
P.S. Of course, we also appreciate no-strain orders for ordinary types of washers, which our 129,000+ washer dies can probably handle easily.

PURCHASING PERSONNEL . . . Free samples available. Request on your letterhead, mentioning types of washers your company uses most frequently. Or write for Washers and Stampings Catalog 40-B.

WW/6/6061/MP

MILWAUKEE WROT WASHERS
WROUGHT WASHER MFG. CO.
2110 SOUTH BAY STREET, MILWAUKEE 7, WIS.
SHeridan 4-0771 • twx MI 277
WORLD'S LARGEST PRODUCER OF WASHERS

cal linear actuator takes advantage of induction principles. Six models, with different stroke lengths and output forces are available from stock for testing, evaluation and prototype use. All of them operate on a standard-ac voltage and come furnished for foot mounting. The linear actuators produce uniform output force throughout the entire stroke in either direction. This

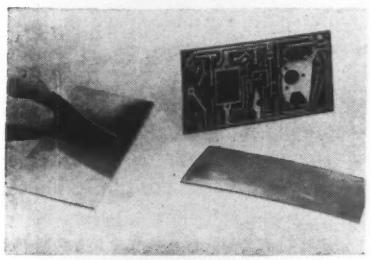


force is directly proportional to the input power. (Skinner Precision Industries, Inc.)

For more data circle No. 35 on postcard, p. 117

Bonds Printed Circuits

Since no single adhesive will meet the requirements of all methods of printed-circuit manufacture, a producer has developed four adhesives to cover the range of individual needs. The various combinations of peelback strength, temperature resistance, and resistance to etching solutions offered by the four should solve even the toughest application problem. The adhesives are applied to copper foil in a 1-2 mil, dry-film thickness. Then, the coated foil dries in air or in an oven. Bonding to the base material under heat and

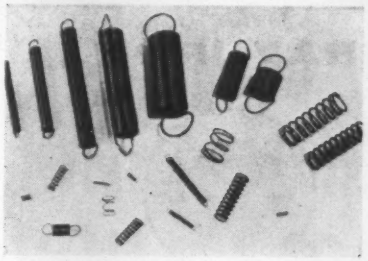


pressure winds up the process. (Minnesota Mining and Mfg. Co.)

For more data circle No. 36 on postcard, p. 117

More Coil Springs

More than 800 new sizes have been added to a line of precision compression and extension coil springs. The new sizes are available as stock items. In most cases, they



can be shipped within 24 hours. Like the other coil springs in stock, the new units come in music wire for standard applications. Where temperatures range up to 250-500°F, stainless-steel wire fills the bill. Both types of wire are certified to military and aircraft standards. (Associated Spring Corp.)

For more data circle No. 37 on postcard, p. 117

Keeps Out Particles

A vented-breather cap features an effective air filter. Developed for

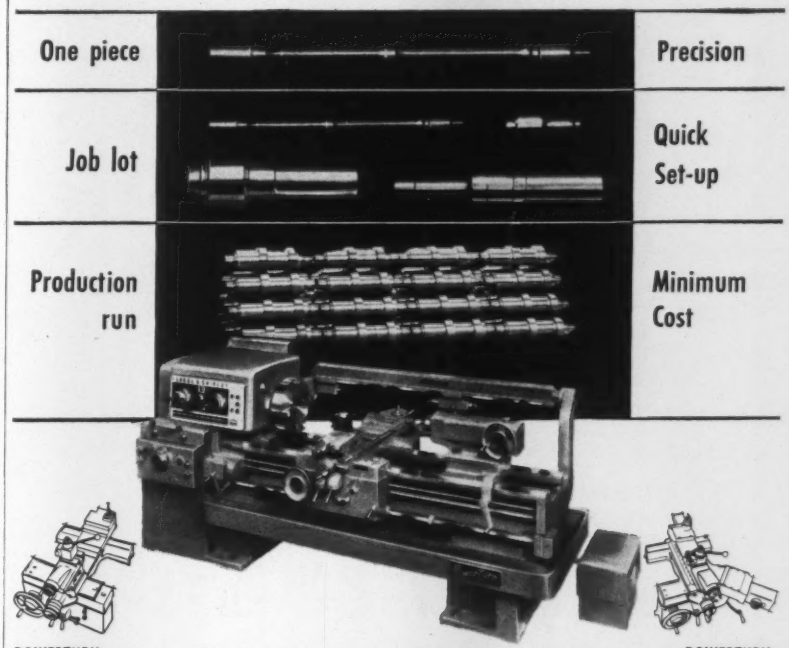
POWERTURN COPYMATIC

...quick-change artist!

One piece — Precision

Job lot — Quick Set-up

Production run — Minimum Cost



POWERTURN 90° COPYMATIC CARRIAGE

POWERTURN 45° COPYMATIC CARRIAGE

You've got a good thing going for you when you install a POWERTURN COPYMATIC. Choose engine lathe operation or instantly change over to tracer controlled duplication. Lodge & Shipley offers you a choice of 45° or 90° hydraulic tracing slides. No awkward projections, built for efficiency and operator convenience.

Whatever your choice, Lodge & Shipley has both. Write for literature describing each type of POWERTURN COPYMATIC... fine lathes with records such as: "saving $14,000 per year"..."production increased 300%"..."saves 85% of former time."

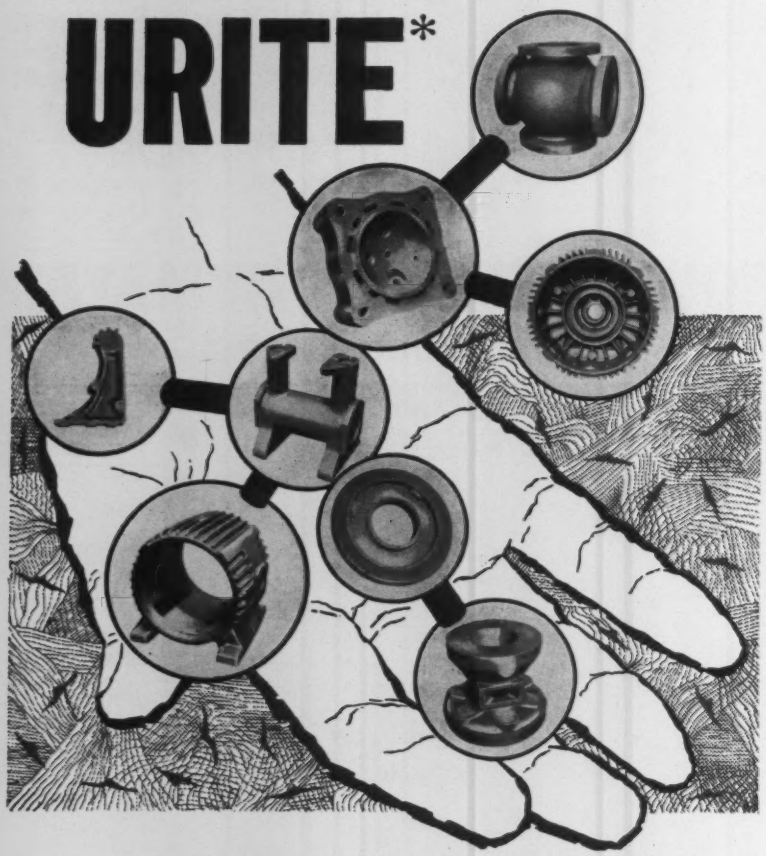
The Lodge & Shipley Co.,
3073 Colerain Ave., Cincinnati 25, Ohio.

your Lodge-ical choice in lathes...

Lodge & Shipley

URICK'S FORMULA FOR BETTER GRAY IRON...

URITE*



**URITE—is poured in various grades with tensile strengths from 30,000 PSI to 60,000 PSI and, upon request, is alloyed to conform to customer specifications.*

FORMULA: **M + I + T + C + P = U = $**

M = Best Raw MATERIALS Regardless of Cost

I = Thorough INOCULATION

T = Good Basic Foundry TECHNIQUES

C = Constant CHECKS & CONTROLS

P = PRIDE of Workmanship (so often lacking today)

U = URITE, a Denser, Tighter, Tougher, Better Machining Iron

$ = Dollars in your pocket when you specify URITE castings.

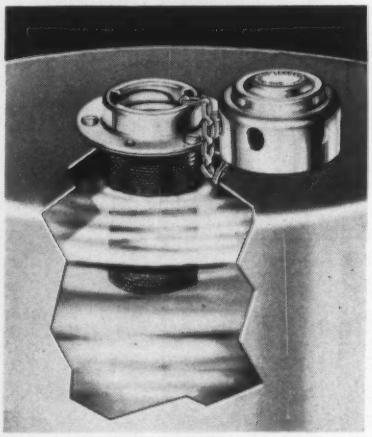
Contact URICK, the foundry that starts with "U" and stays with you. Write for advanced technical data about URITE gray iron castings.

URICK FOUNDRY

ERIE, PENNSYLVANIA

DESIGN DIGEST

use in hydraulic-fluid or oil reservoirs, the newcomers filter particles as small as 40 microns. Here are some of the details. The twist cap locks securely on a close-neck flange. Six 7/32-in. holes are drilled in the flange on 2⅞-in. circle. Cap, flange and a safety chain are all cadmium plated for protection against rust and corrosion. The

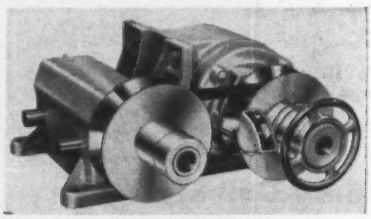


strainer is a top-quality, 30-mesh, brass-wire screen. It's 3-in. deep and 1 15/16 in. in diam. (The Lenz Co.)

For more data circle No. 38 on postcard, p. 117

Variable-Speed Drive

In this new variable-speed drive, a horizontal countershaft assembles 3-, 5-, 7½- and 10-hp drives. The motor mounts at either side of the countershaft. Variable-speed pulleys provide speed ranges as great as 8:1. Either manual or automatic regulators control the speed. Drive position is immaterial, since shafts can operate in both the horizontal and the vertical position. Thus,

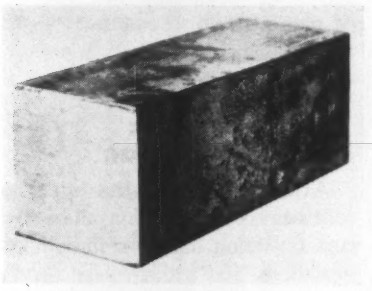


floor, wall and ceiling locations are practical. (Lewellan Mfg. Co.)

For more data circle No. 39 on postcard, p. 117

Hot-Work Die Steel

Non-scaling and refractory to fire checking, a new hot-work steel

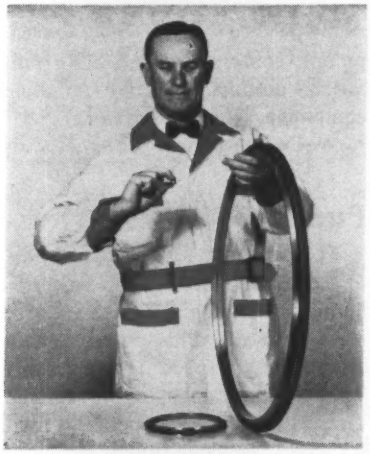


is essentially a high-nickel, chromium-molybdenum die metal. It hardens in air with a little deformation and distortion. In addition, there's great heat and shock resistance. But that's not all, the new steel requires only normal heat treating to develop these properties. Drawing at 950°-1050° F for four hours develops the best heat resistance. Hardness after drawing within that temperature range is 47 RC. (Darwin & Milner, Inc.)

For more data circle No. 40 on postcard, p. 117

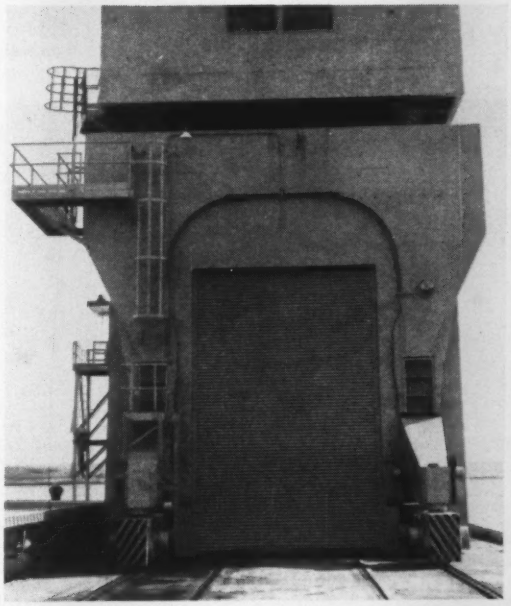
Guards Internal Parts

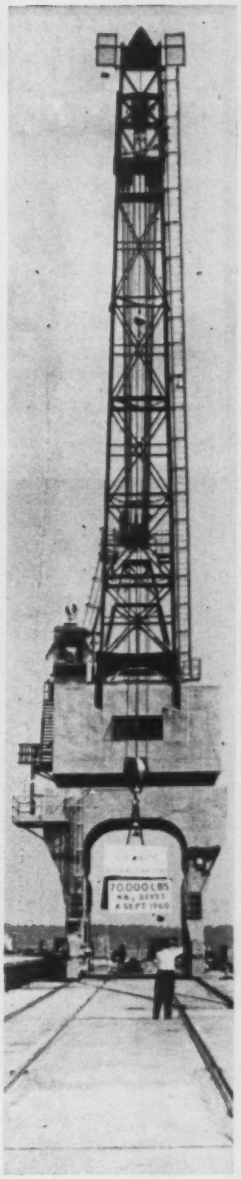
An efficient rod wiper depends on two, conical, bronze-wiper rings,



mounted in a synthetic-rubber cushion ring. These wiper rings have a knife edge that bears against the cushion ring. The wipers make positive contact with the contour of the rod. They thoroughly clean all sand, grit, paint, chips, slivers, rust and the like from reciprocating shafts and hydraulic rods with a positive shaving action. Despite

Giant gantry crane equipped with KINNEAR METAL ROLLING DOORS





Huge Motor Operated Kinnear Doors protect crane's interior from elements

The same space-saving efficiency and ruggedness Kinnear Rolling Doors bring to standard industrial and commercial doorways of every type proves even more important in special applications like this!

These official Navy photographs show a big, high-towered gantry crane* in use at the Polaris Missile Assembly Facility, U. S. Naval Weapons Annex, Charleston, S. Carolina. The large Kinnear Rolling Doors at "fore and aft" of this crane, when closed, fully protect the interior, permitting men to work inside regardless of weather conditions. And open or closed, the doors require no usable "premium" space.

Just one of the many, even more unusual, situations where the proven advantages of Kinnear Rolling Doors can be profitably applied. *We invite you to write for recommendations on your specific requirements.*

**Kinnear recently installed another similar type of installation of doors, 65' wide x 36' high—reputed to be the world's largest rolling doors.*

KINNEAR® ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
FACTORIES:
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Representatives in All Principal Cities

Buy rings that are formed so close to finished shape and dimensions that very little machining will be needed. The result—less labor, less scrap loss, lower overall cost.

Edgewater rings are forged from solid blocks of steel, and rolled by a powerful ring-rolling mill to required cross-section shapes (see typical profiles above). Close tolerances minimize finishing operations.

Edgewater rolled steel rings are of uniform quality, strong and tough. Diameters: from 5 to 145 inches. Send drawings for recommendations and prices.

INTERESTING description of the ring-rolling process is given in this brochure, **Edgewater Rolled Steel Rings.** We will be glad to send you a copy.

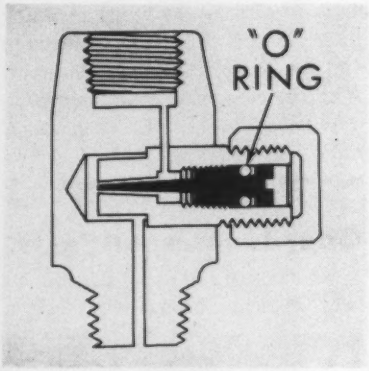
EDGEWATER STEEL COMPANY
P. O. Box 478 Dept. IA Pittsburgh 30, Pa.

high efficiency, they will not scar or mar high-finish rods and shafts. (Hydraulic Accessories Co.)

For more data circle No. 41 on postcard, p. 117

Damps Pulsation

Available in stainless-steel or rolled-brass construction, these low-cost pulsation dampers smooth out vibrations and reduce gage flutter. They guard against excessive wear or destruction of gage mechanisms and maintain calibration accuracy. To do this, a variable orifice smothers surges and shocks by throttling abrupt pressure changes. Pressure limit is 10,000 psi on



pumps, compressors and other pulsation-producing, liquid-handling equipment. (Kunkle Valve Co.)

For more data circle No. 42 on postcard, p. 117

Packless Valves

The principle advantage of a line of newly-designed globe valves is hermitical sealing. This means zero leakage to the atmosphere. In addition, the advanced design permits instantaneous changes in setting. The valves suit high operating temperatures; in fact, 600°F at 2200 psi is the normal rating for pressurized-water reactor service. Extension of even this temperature range is possible by incorporating thermal barriers in the basic design. Furthermore, the valves are packless. They mount in any attitude. (Harmonic Drive Div., United Shoe Machinery Corp.)

For more data circle No. 43 on postcard, p. 117

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Epoxy Formulations

This 48-page publication passes along technical data on an entire line of bonding agents, potting compounds, sealants, coatings and accessories. It also announces a number of new epoxy products. These newcomers excel in high-temperature and thermal-conductivity properties. (Carl H. Biggs Co., Inc.)

For free copy circle No. 1 on postcard

Split-Body Valves

A new valve bulletin is a well-illustrated, 16-page offering. It details the construction and operation of a single-seated, split-body valve line. This split-body design promotes low upkeep and tight shutoff. (Conoflow Corp.)

For free copy circle No. 2 on postcard

A Wealth of Tools

Tungsten-carbide tooling is the subject of a fully-illustrated catalog. It features new sizes and styles of tooling recently added to the line. These include disposable - insert turning tools, inserts in both ground and ground-and-honed grades, and a newly-designed profile toolholder for copying - lathe applications. (Sandvik Steel, Inc.)

For free copy circle No. 3 on postcard

Easy-To-Read Gages

In 12 pages, a new bulletin sets forth detailed descriptions of compact, easy-to-read gages. These units indicate draft, pressure, differential gas pressure and temperature, and pneumatic impulses from transmitters. (Republic Flow Meters Co., a subsidiary of Rockwell Mfg. Co.)

For free copy circle No. 4 on postcard

Universal Ironworker

Brief and to the point, a colorful datasheet introduces the reader to an all-purpose metalworking machine. The new unit features three separate clutches for simultaneous operation by three men. It punches, shears, cuts and slits various metal shapes. (Heller Machinery Co.)

For free copy circle No. 5 on postcard

Emergency Report

In 16 pages, an illustrated study lists data on 10, missile-fastener failures, either in flight, on the test stand, or in preliminary quality-control testing. It urges emergency action to insure greater mechanical reliability. (Standard Pressed Steel Co.)

For free copy circle No. 6 on postcard

Controlled Grinding

The Grinding Wheel Institute announces publication of an 81-page booklet entitled, "Grinding Stresses: Cause, Effect and Control." This comprises the collected papers which have been published as articles in the trade press. For a free copy, write on company letterhead to Grinding Wheel Institute, 2130 Keith Building, Cleveland.

For free copy circle No. 7 on postcard

Why Mercury Lamps?

Included in a new pamphlet are facts about mercury-lamp life and maintenance, lamp construction and a chart on lumen output. The booklet also contains a helpful list of the

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 7/20/61

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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51	52	53	54	55	56	57	58	59	60
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NEW YORK 14, N. Y.

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FREE LITERATURE

various types of mercury-vapor lamps, including photographs of each variety. (Westinghouse Electric Co.)

For free copy circle No. 8 on postcard

Tube-Production Units

In full color, a new 34-page brochure illustrates and describes a line of tube - production equipment. Tube-welding mills are available in five standard series to produce tubing from ¼-7 in. ID. (The McKay Machine Co.)

For free copy circle No. 9 on postcard

Slotted-Angle Framing

Simple, "do-it-yourself" framing with an unusual slotted angle is described in a comprehensive brochure. Emphasis is on the simplicity of precision holes and slots. They permit shear-to-size usage and perfect alignment for time- and cost-saving assembly. (Acme Steel Co.)

For free copy circle No. 10 on postcard

Materials Handling

How a major public warehouse maintains 24-hour, high-speed distribution is the subject of a new case-history bulletin. The literature stresses the role of electric-powered, fork-lift trucks and related materials-handling equipment. (Lewis-Shepard Products Inc.)

For free copy circle No. 11 on postcard

Numerical Control

Valuable educational data about the growing machine-tool, numerical-control field is available in a 32-page booklet. It defines the meaning of numerical control and explains the use of punched tapes in machine - tool applications. (Friden Inc.)

For free copy circle No. 12 on postcard

Fire-Brick Folder

Two new fire-brick lines, for use in prepared atmospheres, are described and illustrated in a four-page brochure. The folder spells out the advantages of these materials, including low - iron content, light weight, low-thermal conductivity, high-load bearing strength and ease of cutting. (Johns-Mansville)

For free copy circle No. 13 on postcard

Flexible-Coupling Data

A new bulletin covers flexible couplings and a newly-designed coupling cover. The literature stresses the advantages of flexible couplings. It also lists standard sizes and prices. (Acme Chain Corp.)

For free copy circle No. 14 on postcard

Clue for Bar Makers

How can you extend an Acme-Gridley bar machine's capability and realize tangible cost savings? The answer can be found in a new four-page bulletin. It introduces an attachment that completely eliminates loading downtime. (The National Acme Co.)

For free copy circle No. 15 on postcard

Aids Crane Engineers

Now available is a new crane-specification tablet. It contains five duplicate sets of crane data and forms. These aid in establishing crane specifications for any given application. (Conco Engineering Works, Inc.)

For free copy circle No. 16 on postcard

Machine-Drive Units

Available in open, enclosed, or liquid-cooled ratings ranging from ½-150 hp, a new shell-type motor is actually a built-in machine drive. It features accuracy and close tolerance to ease assembly and ensure correct fit with machine components. All the details are given in a four-page bulletin. (The Louis Allis Co.)

For free copy circle No. 17 on postcard

Space-Age Fasteners

Engineering prints supply exact data on a line of fasteners for effective, elevated-temperature use in a technical-data catalog. The folder illustrates bolts, screws, nuts, dowels and miniature internal-wrenching bolts. (Mercury Air Parts Co., Inc.)

For free copy circle No. 18 on postcard

NEW PATENTS

Sintering Pallet

Pallet construction for sintering apparatus, V. E. Koontz (assigned to Dravo Corp.), May 23, 1961. A new type of pallet construction, for use in downdraft sintering of iron-ore pellets, overcomes the usual sagging caused by high-process heats. U. S. 2,985,440.

Resists High Heat

High-strength, heat-resistant alloy steel, E. J. Dulis, A. Kasak and V. K. Chandhok (assigned to Crucible Steel Co. of America), May 30, 1961. A high-strength, heat-resistant ferritic steel comprises preferably 0.35-0.4 pct C, 7-9 pct Cr, 0.5-1 pct V, 5-7 pct Mo, 5-8 pct Co, up to 1 pct Ti, up to 1 pct Cb plus Ta, up to 1.5 pct W, up to 0.01 pct B, and the remainder essentially all Fe. U.S. 2,986,463.

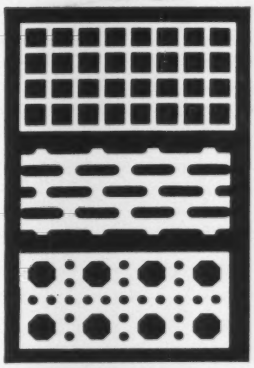
Reduced-Iron Product

Production of iron, D. F. Babcock, R. M. Drews and S. R. Crooks (assigned to R-N Corp.), May 30, 1961. Here's a new method for producing a reduced-iron product from iron-oxide ores. Even at very-high metallization this product can be readily pressed into strong briquettes for use in open-hearth furnaces. U.S. 2,986,460.

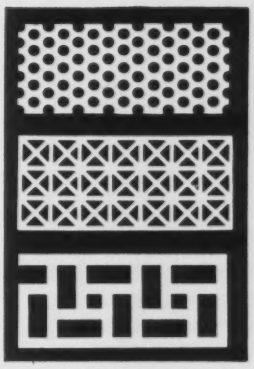
Iron Production

Production of iron from ferrous-slag materials, A. F. Johnson (assigned to Strategic Materials Corp.), May 30, 1961. In the recovery of low-sulphur iron from iron-silicate slags, such as fayalite, the slag is charged into a furnace over a pool of molten iron. Then it's injected with lime and a hydrocarbon gas. Iron from the slag migrates to the molten-iron pool. U.S. 2,986,458.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



THE MONEY-SAVING ANSWER to Many Production Problems



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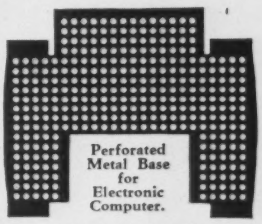
For nearly half a century we have supplied America's largest industrial organizations with perforated metal products of all kinds; in lots to meet their production schedules. This procedure not only reduces their inventory costs but, usually, also assures other substantial savings because of our special facilities for producing this type of work efficiently and economically.



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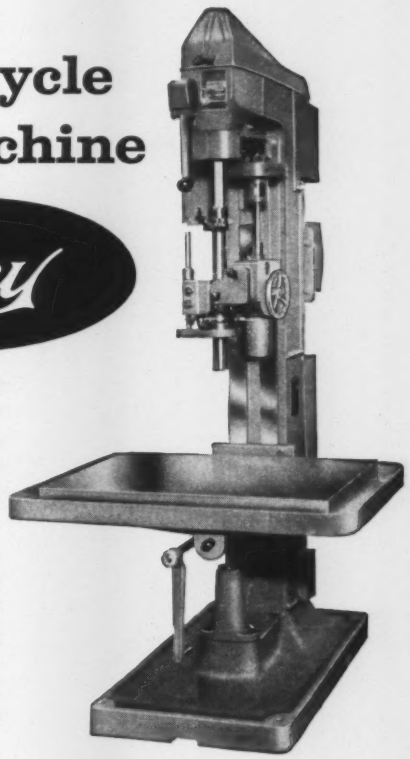
Avey



You can chop your time costs with automatic set-ups on this new Avey machine, and still take advantage of the low cost and flexibility of a standard unit. Adjustable rapid power traverse, feed, and rapid return of the spindle permit automatic transfer or rotary index fixturing. You also get adjustable feeds, speeds, table travel, head travel, and Avey's precision spindle. Morse Taper 2, 3, or 4; single or multiple spindles 1 to 5 hp. *Write or phone for data.* Avey, Box 1264, Cincinnati 1, Ohio.

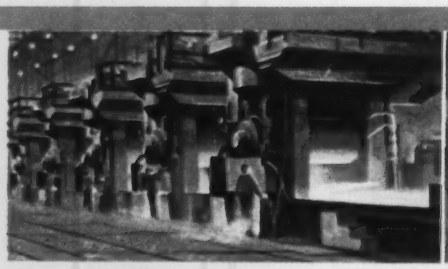
MIDWEST, NATIONAL STEEL'S NEWEST

The continuous galvanizing line shown above and an electrolytic tin plating line are the first major facilities at work at our new Midwest Steel division, strategically located in the important Chicago area. They incorporate the most advanced techniques known to modern engineering; they produce the last word in quality.

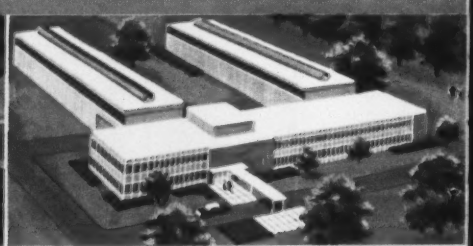
Galvanized steel made by the continuous line method is so superior that it constantly finds new uses in manufactured products of many kinds . . . products which are improved in quality and durability by the combination of steel's strength with zinc's protection. Demand for tin plate grows, too, as more items go to market in tin cans.

The galvanizing and tin plating lines will soon be followed by ultra-modern facilities for producing hot and cold rolled sheets . . . making Midwest Steel a major source of supply for the Chicago district and the fast-growing, steel-consuming area served from it. We are proud that Midwest has been constructed not only for top efficiency but also as one of the cleanest, most attractive industrial plants ever built.

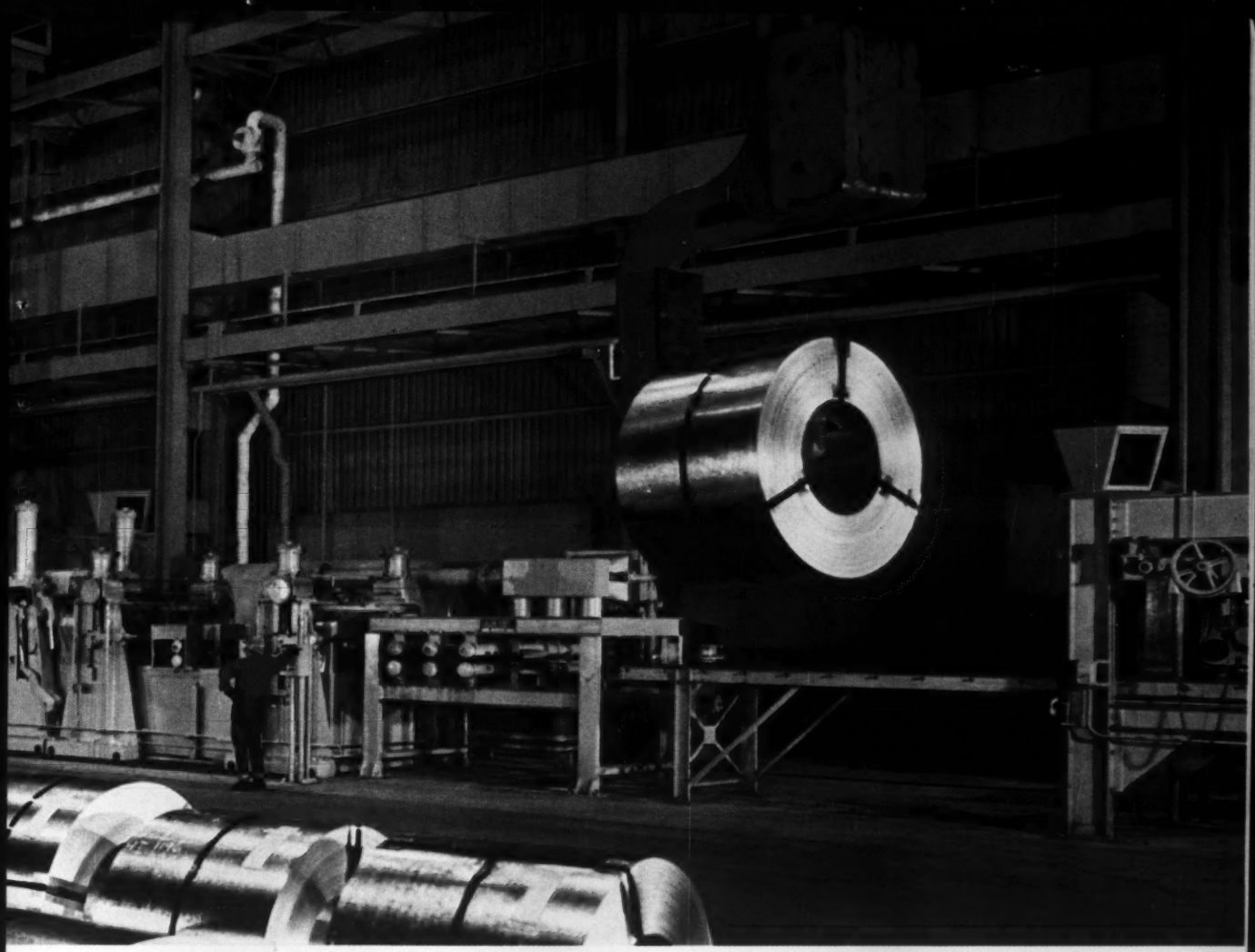
FIVE OTHER MAJOR STEPS TO FURTHER PROGRESS



AT GREAT LAKES STEEL in Detroit, the computer-controlled and operated 80" Mill of the Future—fastest, most powerful hot-strip mill in the world—will provide more and better automobile body sheets.



OUR NEW RESEARCH CENTER will be National Steel's headquarters for the expanded, continuing exploration of new and better raw materials, facilities, manufacturing processes and products of steel.



DIVISION, SWINGS INTO PRODUCTION

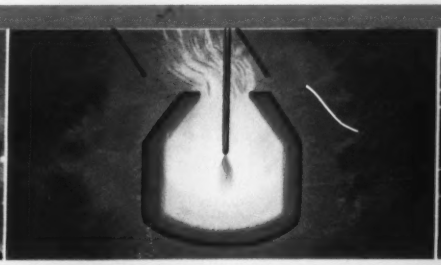
Midwest Steel is an important part of an overall construction program involving all operations of National Steel and costing well over $300,000,000. It will be substantially completed this year. The results: for our employees, more secure jobs; for our customers, a better supply of the highest, most uniform quality of steel yet produced. And for you, the consumer, still better values in the million and one products made of steel. We will be bringing you the news about other phases of this program as they swing into action.

NATIONAL STEEL CORPORATION, PITTSBURGH, PA.

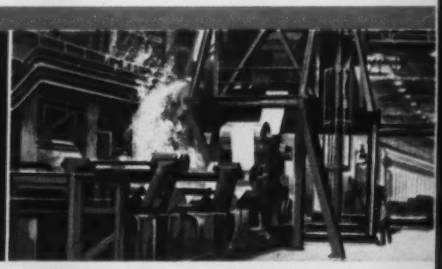
SUBSIDIARIES AND DIVISIONS:

GREAT LAKES STEEL • WEIRTON STEEL • MIDWEST STEEL • STRAN-STEEL • ENAMELSTRIP • HANNA FURNACE • NATIONAL STEEL PRODUCTS

AT STRAN-STEEL in Terre Haute, new finishing-line facilities are boosting quality and output of popular color-coated steel panels for Stran-Steel's handsome new line of contemporary pre-engineered buildings.

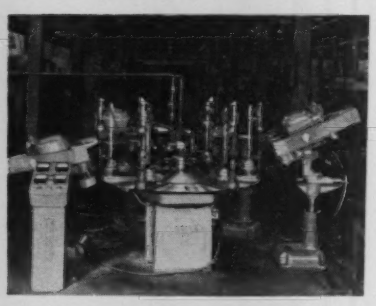


NEW BASIC OXYGEN FURNACES at Great Lakes Steel. Construction will start in 1961 on two basic oxygen furnaces — the largest ever built — which will add new capacity and greater efficiency.



AT WEIRTON STEEL in Weirton, W. Va., new and improved facilities throughout this division will increase the production and improve the quality of Weirton's tin plate, galvanized sheets and cold-rolled sheets.

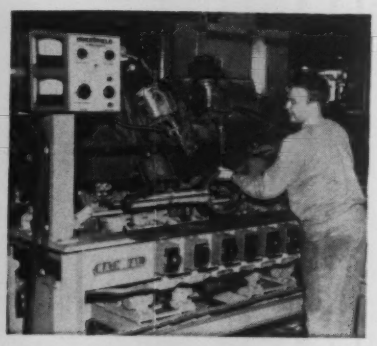
New Equipment and Machinery



High-Speed Unit Polishes Hard-to-Reach Contours

A rotary contour-polishing machine turns out as many as 1000 small metal parts or tools every hour. It polishes and grinds contours that only hand methods reached before. For instance, contours on hand tools, firearms, jet blades and automotive parts fall within its scope. In addition, the new machine adapts for high-speed polishing of flat surfaces as well as contours. Basically, it consists of an indexing-type conveyor and four abrasive-belt head units. These head units feature air control of both belt tension and the contact wheel. (Divine Bros. Co.)

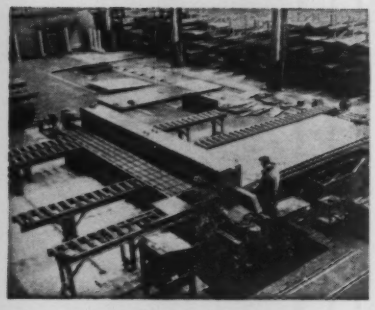
For more data circle No. 44 on postcard, p. 117



Mobile Arc Welders Slash High Production Costs

When does it pay to scrap a classical production-welding method? If you're in doubt, you might take a lead from the cost-conscious automotive industry. One car maker, for example, was paying too high a price in floor space and equipment upkeep. A time-honored method for welding rear-axle housings was the culprit. The equipment was complex and massive. A closer look revealed fixturing was outdated and that positioning left much to be desired. So the company turned to compact, mobile arc welders. Floor-space needs tumbled 65 pct. The new units also improved the weldment quality. (National Electric Welding Machines Co.)

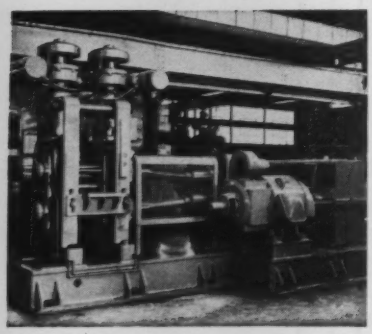
For more data circle No. 45 on postcard, p. 117



Massive Saw Expands Steel-Warehouse Capacity

This huge steel-sawing machine handles straight cuts up to 20-ft long on low- and medium-carbon steels. It's the world's largest facility in the steel-warehouse industry. The Horace T. Potts Co., Philadelphia, installed it during a recent expansion program that upped capacity 50 pct. In warehouse operations, sawing eliminates annealing after the cut. Wide cold-rolled flat bars can be trimmed full length to exact dimensions. You get a smooth, machine-cut edge. Very often, this means the fabricator can forget about additional finishing. (Oliver Machinery Co.)

For more data circle No. 46 on postcard, p. 117



Versatile Mill Features Interchangeable Rolls

Using interchangeable roll sets, a milling machine takes on the work of several mills. It processes a wide variety of medium- to super-strength alloys at a large research facility in the midwest. The newcomer is a two-high/four-high combination, 14-in. wide. Normally, it employs 3-in. diam work rolls and 10-in. diam back-up rolls. However, 12-in. rolls handle two-high flat rolling. In addition, the mill adapts to 12-in. diam x 24-in. long grooved rolls for rod and other shape rolling. Large cast-steel frames meet the demands of this versatility. They withstand heavy work loads with minimum deflection. (Stanat Mfg. Co., Inc.)

For more data circle No. 47 on postcard, p. 117

Analyzes Gears

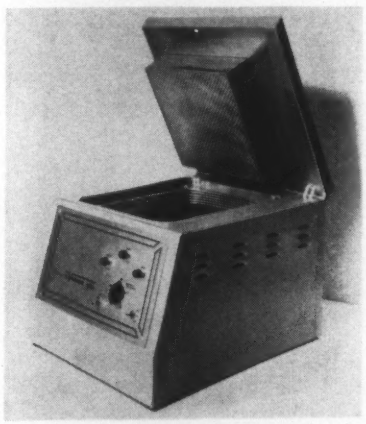
Using inertia principles and electrical indicators, a rolling fixture-type gear analyzer provides three simultaneous precision measure-

ments of gear-tooth accuracy. It detects nicks on tooth profiles as small as 0.0005-in. high. To analyze a gear, the newcomer is first set up with master-pitch cylinders. Then, the master gear is mounted in position. As a work gear is lowered over its mounting shaft, it meshes with the master gear. At the bottom of its downward motion, the work gear actuates a cycle switch that energizes a checking-delay timer. Then the gear gets gaged on the next revolution. Signal lights tell the operator the three-property tolerance condition of the work gear. (National Broach & Machine Co.)

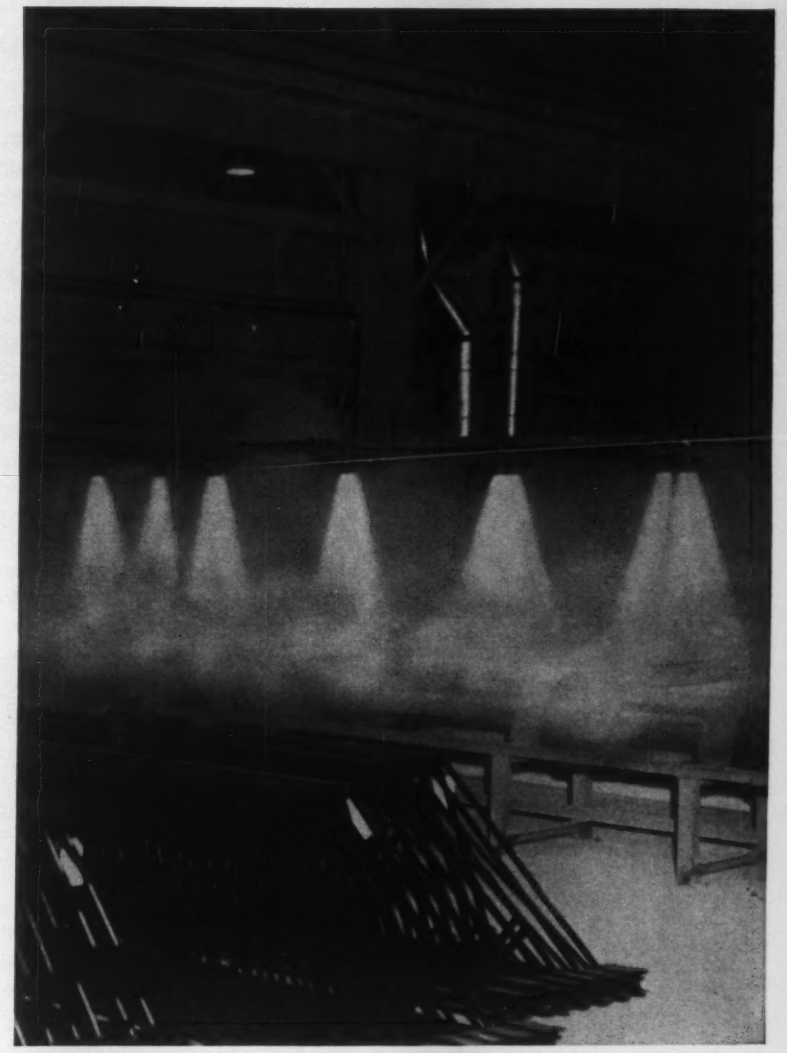
For more data circle No. 48 on postcard, p. 117

Cleans Small Parts

Originally developed to handle transistors, this one-step batch



cleaner has proved its worth in other operations as well. It's been used successfully on electronic components, printed circuits and machined parts and lenses. Cleaning



What put out the flo-coat and drier fire?

For fires in flo-coaters, driers, quench tanks, dip tanks, storage rooms . . . nothing beats a Kidde fully automatic carbon dioxide fire extinguishing system. U.L. and F.M.-approved Kidde systems go into action at the first sign of a blaze, snuff out fire in seconds, leave no mess to clean up later. Protect yourself by protecting volatile solvents, gases, flammable liquids—*all hazards*—with an automatic Kidde system. Kidde's 40 years' experience can help you guard any fire hazard. Write today and find out how.

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In heart of metal working industry.
Seven large truck line terminals.
New York Central and
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Convenient to Birmingham.
On U. S. Highway 278.
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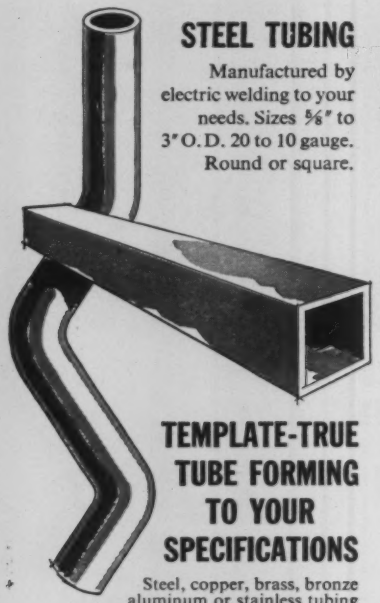
STEEL TUBING

Manufactured by electric welding to your needs. Sizes ⅝" to 3" O.D. 20 to 10 gauge. Round or square.



TEMPLATE-TRUE TUBE FORMING TO YOUR SPECIFICATIONS

Steel, copper, brass, bronze aluminum or stainless tubing fabricated to your specifications. Sizes ⅜" to 6" OD, 20 to 10 gauge.

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Top-flight engineering service.

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706 Prairie Street, Sturgis, Michigan

Formed Tubes, INC.

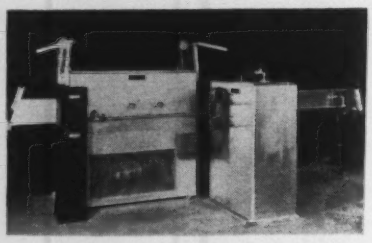
NEW EQUIPMENT

is accomplished by pure-solvent vapors with a simultaneous flushing action from pure-solvent condensate that rains down on the work. (Currier Co.)

For more data circle No. 49 on postcard, p. 117

Continuous Furnace

In place of a continuous-mesh belt, this new controlled atmosphere furnace employs a chain-pull mechanism at the discharge end. Flat rods, supplied by the user, pull the work through the furnace. These rods hook together, and the chain mechanism pulls them through the furnace. This method is used because the light weight of the workpieces involved makes a continuous-

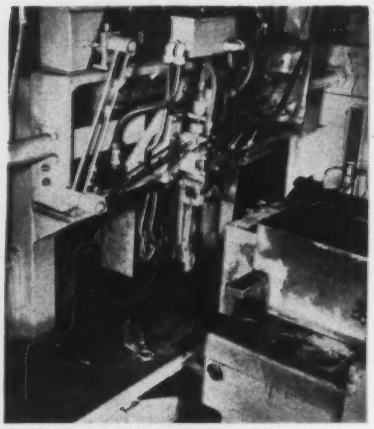


belt line impractical. But it also has merits of its own. It does away with the continuous heating and cooling of a heavy-wire mesh. The furnace is an example of a unit specially-built to satisfy individual-heating requirements. (The Waltz Furnace Co.)

For more data circle No. 50 on postcard, p. 117

Drop Forgings

An unusual horizontal hammer distinguishes this new unit designed to produce a wide variety of drop forgings in job-lot quantities. Three initial sizes accommodate a complete range of drop forgings usually made in gravity-drop hammers of 1000-3000 lb falling weight. Larger units are feasible, however. They'll be engineered as the demand for them develops. Brain of the new process is the comprehensive control panel. It mounts all the selectors and electrical controls. The machine has five separate die stations, at which ten controlled blows may be struck. Program changes are quickly made, even while the process is in operation. Numerical control, man-

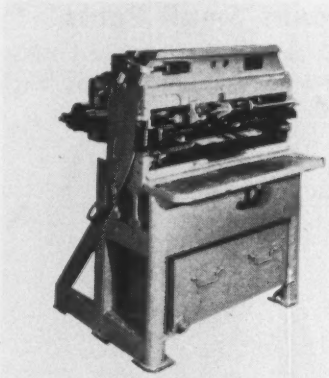


ual, tape or card type, is applicable. (Chambersburg Engineering Co.)

For more data circle No. 51 on postcard, p. 117

Shaft Knurling Unit

Recently introduced to the market is a shaft-knurling machine which accommodates up to 20-in. shafts, ⅝ in. in diameter. It installs a spline-type knurl up to 4 in. long. Ejection of the finished parts is automatic. A drain tray receives them. With a conveyor to transport the parts to the next operation, it fits in with a fully-automated line. Primary use for the new machines



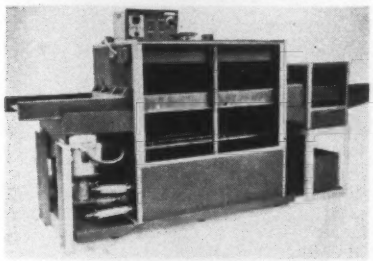
is with small motor manufacturers. The unit puts the knurl on armature shafts. (Morley Machinery Corp.)

For more data circle No. 52 on postcard, p. 117

Volume Spray Etching

A new spray-etching machine suits volume production. It features completely rackless operation that

adapts to an automatic conveyor-type production line. In addition, the unit carries the work horizontally through the etch and rinse chambers. Thus top and bottom are treated at the same time. Oscillating spray banks and adjustable-etching pressures preclude differential etching between top and bottom. With this system, very-fine and uniform work is possible. For printed-circuit boards, thin-metal parts, and other

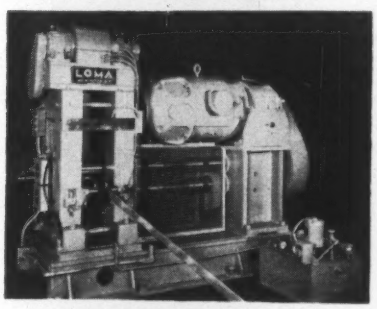


chemical-machining work, undercut is held to a minimum. (Chemcut, a div. of Centre Circuits, Inc.)

For more data circle No. 53 on postcard, p. 117

Versatile Rolling Mill

If you want to handle a wide variety of metallurgical - processing work with a single mill facility, this new 2-high/4-high combination may be the answer. It suits hot and cold work; rolls flat and shaped stock as is, or under tension. Heavy-duty design lets the mill take reductions of more than 50 pct per pass. Even so, it maintains tolerances as close as 5-pct of thickness. The 2-high arrangement handles either hot or cold breakdown rolling of plate and sheet. Grooved rolls are available to process rounds, squares and other shapes. In the 4-high setup, the strip



is cold-rolled to gages as thin as 0.002 in. (Loma Machine Mfg. Co., Inc.)

For more data circle No. 54 on postcard, p. 117

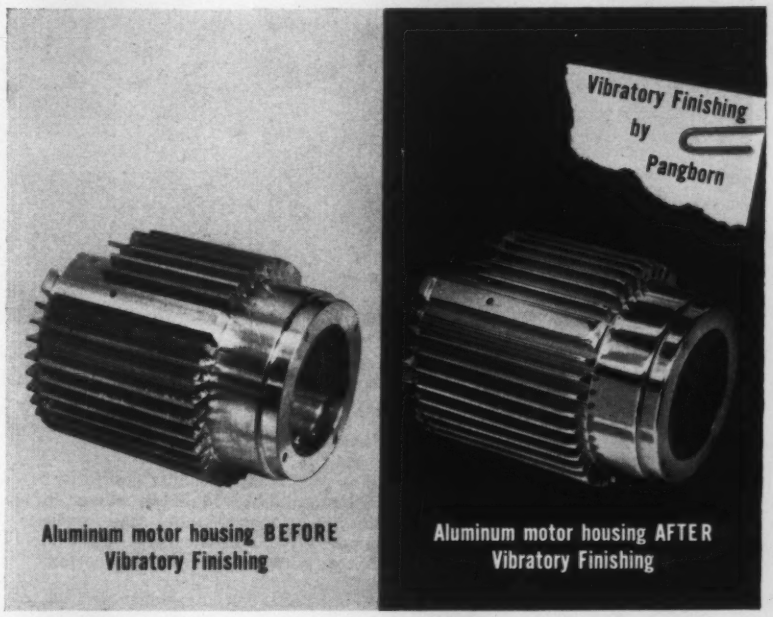
Marking Machine

Applying all-pneumatic operation to general-purpose marking, a new machine has all operating mechanisms in its compact head. This head is comparable to an air or hydraulic press, in that it supplies both the marking pressure and the horizontal die travel for roll marking. Air pressure controls depth of mark and insures uniformity of impression depth. It does this for each work piece, regardless of variations in the work thickness. The machine comes with all necessary air controls, including pressure regulator, filter, lubricator and gage. (Noble & Westbrook Mfg. Co.)

For more data circle No. 55 on postcard, p. 117

Spraying System

For medium production requirements, a high - pressure, airless spraying system gives top-quality finishing results. It provides pressures to 2800 psi. The system is a



Amazing, how inexpensive complex finishing can be!

In some cases, the Pangborn Vibratory Finishing Machine has reduced finishing time by over 90%. You know what this means in time and labor savings alone. Especially since this machine tackles complex finishing assignments with the same ease and speed as simple ones.

Its uses are amazing, too. It descales, deburrs, burnishes, radiuses, fine-finishes. It handles a wide variety of materials . . . metals, plastics and ceramics. And this machine tackles complex and difficult jobs impossible or impractical to do by other methods . . . and does them quickly and economically.

The exclusive air-cushioning system built into every Pangborn Vibratory Finishing Machine provides better and closer amplitude control and offers automatic adjustment for any weight load. Air-cushioned floor mounts eliminate any transmitted vibration. No special foundations are necessary. Variable speed controls available on all models. Automated and auxiliary equipment, media, compounds for every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William Brandt at:

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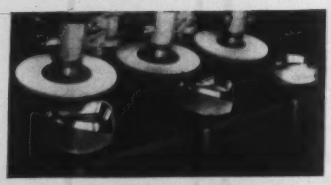
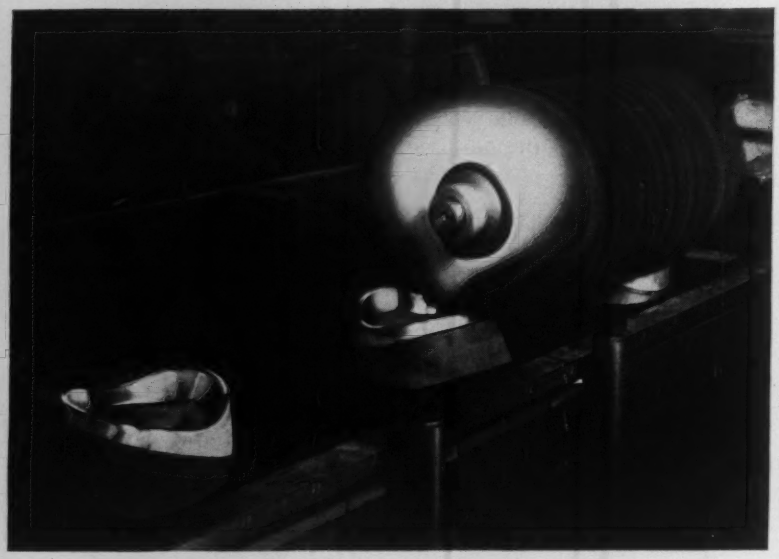
ACME IN ACTION





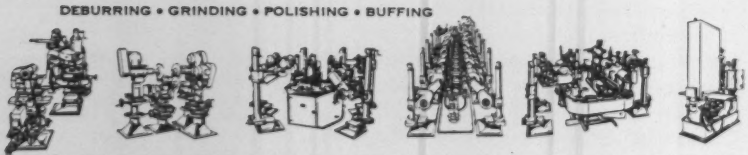
Doing more work with *Movement and Motion*

Good example of versatility in quality finishing equipment is the Acme Automatic Straight-Line Machine shown in action above. It's the "universal" type—one of many basic modular unit designs pioneered by Acme during the past 50 years to do more work better with movement and motion.

Made of standard sections assembled to any length desired, it can incorporate any number and combination of standard adjustable Acme heads designed to perform a variety of operations on a wide range of parts. Deburr, grind, polish and buff. Work-holding fixtures can be arranged for automatic lock and unlock. And the parts themselves can be run in a fixed position, rotated in one or both directions, or cammed as may be required to finish specific areas, assure ultimate uniformity of product quality.

Other types of Acme automatic straight-line polishing and buffing machines include Reciprocating, Fixture-Return, Horizontal-Return, Over-and-Under, Rotary and Rectangular. Send for complete information today!

DEBURRING • GRINDING • POLISHING • BUFFING



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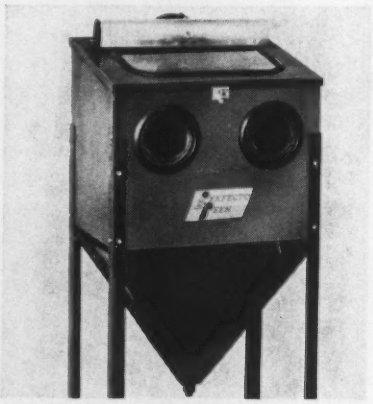
NEW EQUIPMENT

complete, ready-to-spray assembly consisting of the pump and container, high-pressure hose assembly, spray gun and a choice of tungsten carbide spray tips. It operates efficiently on a 1- or 1½-hp compressor. (The Spee-Flo Co.)

For more data circle No. 56 on postcard, p. 117

Dry-Blasting Machine

Here's a new machine that fills the need for a time-saving piece of cleaning and peening equipment at a low price. Air requirements are only 60 psi at 15 cfm. In fact, a 1½-hp compressor and a 60-gal tank is adequate for most operations. The "blaster" takes from five to six lb of abrasive material for each loading. This abrasive lasts about 25 hr of operating time. Despite this operating economy, the machine cleans down to the original surface. This means goodbye to the

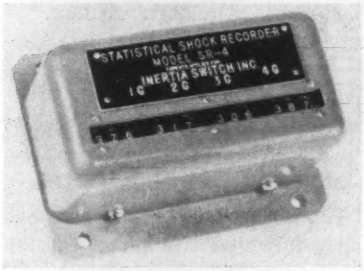


messy chemical vat and the time-consuming wire brush. (Perfecto-Peen, a div. of Aero-Test Equipment Co., Inc.)

For more data circle No. 57 on postcard, p. 117

Gages Shock in Transit

Here's an accurate and reliable, statistical shock absorber that monitors the shocks received in shipping and processing. This information is especially valuable for missiles, instruments, and other expensive or delicate equipment. Excessively-rough handling can cause costly failures. But it's always tough to pinpoint the cause of failure. With a record of the shipping shocks, you can definitely establish, or eliminate,



handling factors as a reason for poor performance. (Inertia Switch, Inc.)

For more data circle No. 58 on postcard, p. 117

Cylindrical Grinder

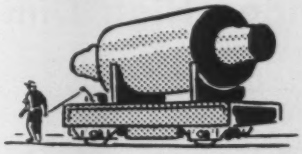
In addition to manual operation, an electro-hydraulic cylindrical grinder provides automatic cycling. It features an advanced servo-control unit. The combination of servo motors and magnetic valves, controlled by potentiometers, results in precise setting of table and wheelhead feed rates. For maximum simplicity and speed, all motions involved in the grinding cycle are dialed in on the control panel, located in front of the machine. (Austin Industrial Corp.)

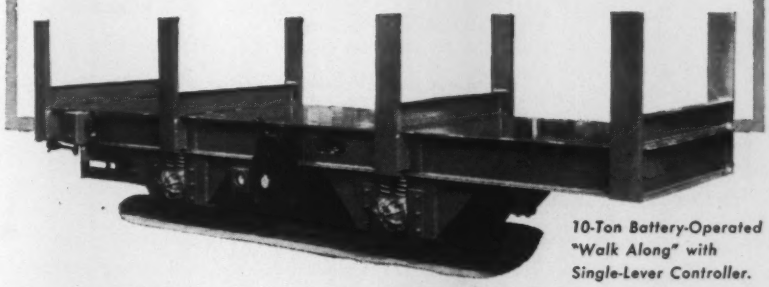
For more data circle No. 59 on postcard, p. 117

Marks Tubing

Variable-speed motor drive permits production of 60-190 pieces per minute, with a new automatic tube-marking machine. The equipment automatically feeds, marks,

Safety-type Transfers





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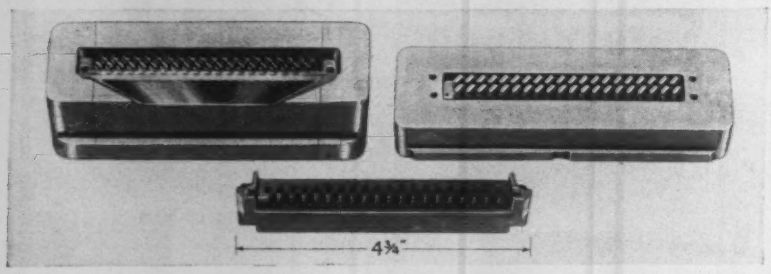

Transfer Mold made by H. Feier Tool and Machine Co., Merchantville, N. J.

With a plastic part this complex, retaining dimensional stability of the transfer mold is important! Elco Corporation, Philadelphia, found UHB Orvar "Superior, even on long sections . . . ". This transfer mold will produce approximately 3 million Diallyl Phthalate plastic electronic connectors, at 25 shots per hour – 3000 psi. The mold cavity was easily machined. Heat treatment brought hardness to Rockwell C 53-55, without deforming or scaling.

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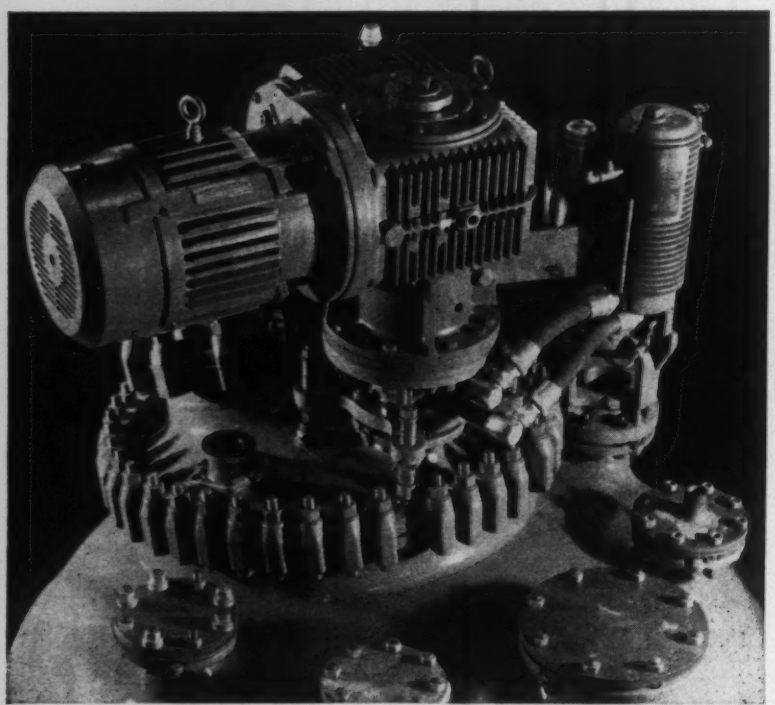
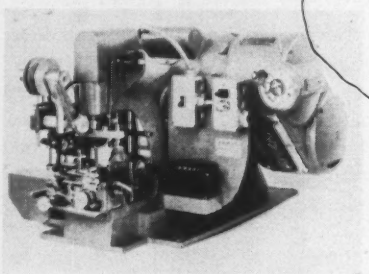


ROCHESTER, N. Y.—The Pfaudler Co. reports space savings and reduced maintenance on their new line of TW Agitation Drives for glassed-steel and alloy mixing vessels due to vertical hollow-shaft double-enveloping worm gear reducers by Cone-Drive Gears, Division Michigan Tool Co., 7171 E. McNichols, Detroit 12, Michigan.

NEW EQUIPMENT

and cuts to the desired length all types of flexible plastic tubing used as code markers for wire and cable. Since imprints are made by a dry-



heat bond process, the tubes may be used immediately. There are no drying problems. Another useful feature is the automatic counter. It stops the machine as soon as a preset count is reached. (The Acromark Co.)

For more data circle No. 60 on postcard, p. 117

Tensions Steel Straps

Three new tools tension and seal heavy-duty steel strapping. One of the three, an air-powered strap tensioner teams up with either of the other two air-powered sealers to apply steel strapping in many packaging operations. The tensioner tightens up the strapping prior to sealing. This makes the line ideal for bun-

dling tubes and rods, tying mill coils and securing sheet metal. (The Stanley Works)

For more data circle No. 61 on postcard, p. 117

Laps Piece Parts

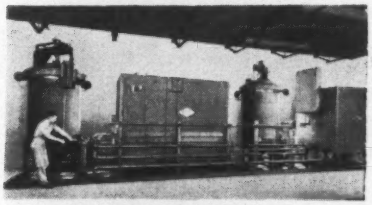
With newly-designed pneumatic lifts, a flat-lapping machine offers micro-in. precision in lapping and finishing piece parts on a volume

basis. The new lifts eliminate awkward holding devices and magnets. Furthermore, they automatically apply the correct pressure for lapping a wide variety of materials. (Spitfire Tool & Machine Co.)

For more data circle No. 62 on postcard, p. 117

Seals Castings

A new duel-autoclave, batch-type castings impregnation machine uses a single steam jet to provide the vacuum for both autoclaves. This feature cuts initial costs and results in operating economy. Main use for the new machine is in sealing cast-aluminum, automotive-transmission cases with a metal-oxide sealant. There is a twofold advantage in the

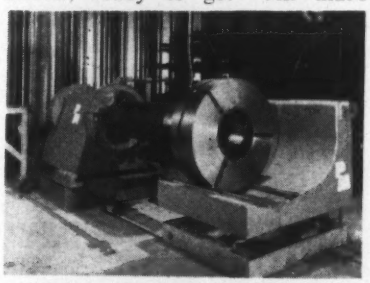


steam-jet vacuum system. First, the 29.7-in. vacuum develops faster than with a vacuum-pump system. Secondly, there's a considerable saving in capital investment. (Prenco Mfg. Co.)

For more data circle No. 63 on postcard, p. 117

Travels on Rails

A new coil-loading buggy offers two important advantages. First, it provides a fast and efficient means of accurately positioning coils on an uncoiler mandrel. Secondly, it allows for storage of another coil. Thus, you can load the buggy whenever a crane or lift is available. This avoids costly downtime in line operation. Hydraulics operate the new unit, and it comes completely furnished, ready to go. All that's

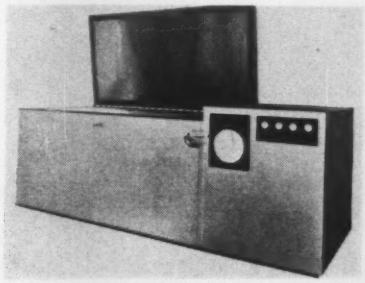


needed for inexpensive installation is a source of electrical power. Optional features include heavy-duty blocker rolls set into the cradle. These rolls assist in the threading operation. (Production Machinery Corp.)

For more data circle No. 64 on postcard, p. 117

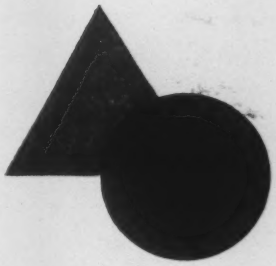
Environmental Chamber

With a closed mechanically-refrigerated system, a new test chamber reaches –250°F. It can be used



to increase the life of processing dies, tools, drills and broaches. Other uses include liquefaction of gases, metal hardening and component testing. (Webber Mfg. Co., Inc.)

For more data circle No. 65 on postcard, p. 117



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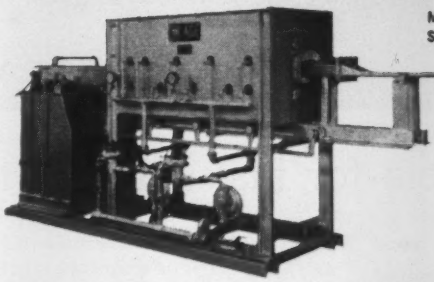

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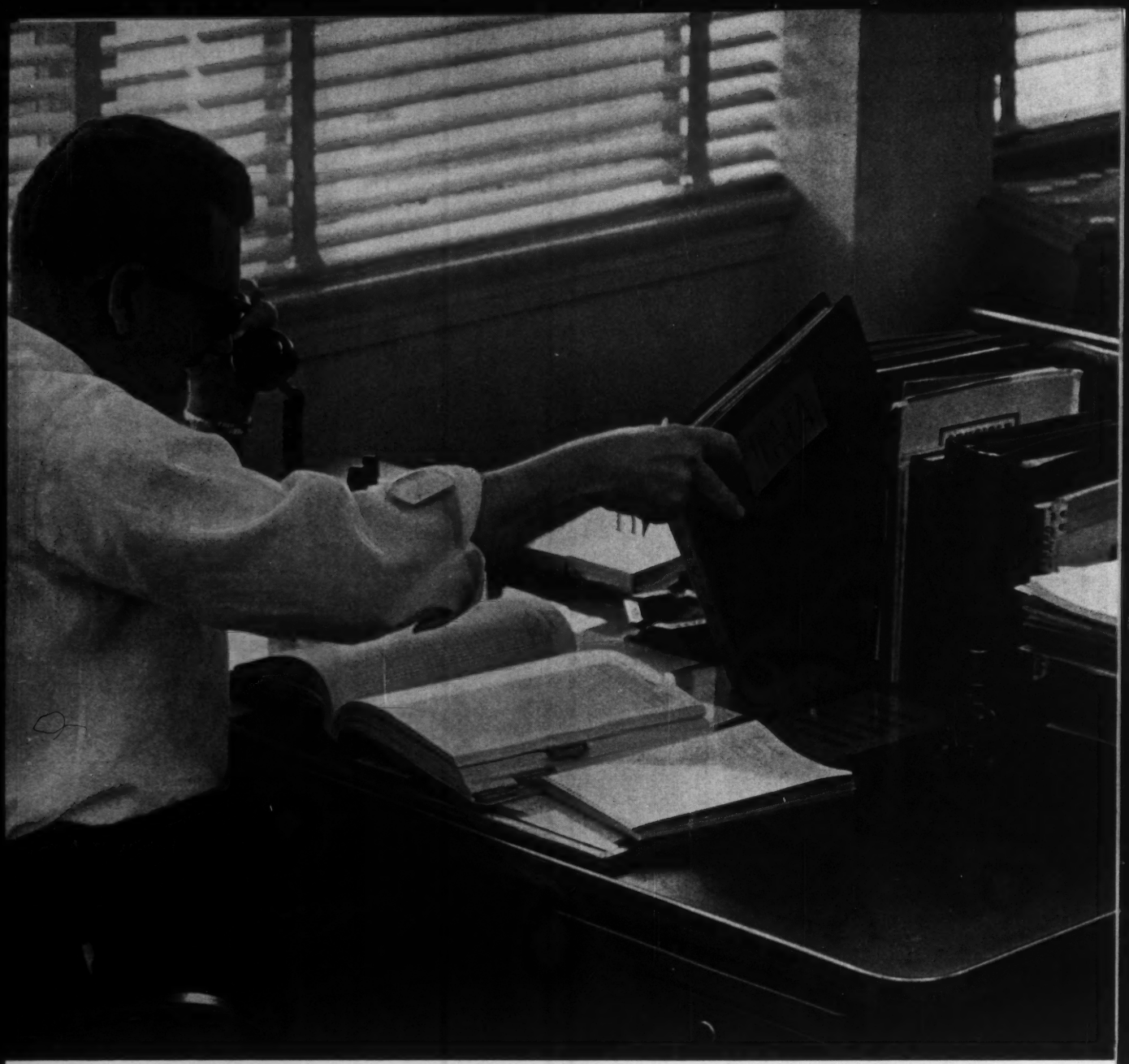

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CRUCIBLE STEEL COMPANY OF AMERICA

Market Reflects Hesitation

August still could be a very good month. But some uncertainty is noted.

On one hand, there is some hedging against a steel strike. But automakers show hesitation over their labor negotiations.

■ If late orders for August come in according to the pattern of recent months, delivery dates for many steel products will stretch out.

At the same time, the first instance of strike hedging is reported. One substantial user's advance buying this week can be attributed directly to assuring steel supplies in advance of the 1962 expiration of the steel labor contract.

In still another development, some uncertainty is noted in auto steel ordering in advance of the auto industry's own labor contract expiration this Aug. 31.

Business Crosscurrents — These crosscurrents in the steel market account for some of the uncertainty in the steel market this week. Developments that point to a stronger market dominate. But there are enough hints of uncertainty to prompt caution in the steel market.

On the order pattern in the first days of July, orders for next month delivery came in at a rate that exceeded comparable orders for May and June. But a mid-month slack period followed. If the pattern of the previous recovery months continues, orders late this month and even in early August should put August production and shipments over the May-June level.

In any case, the outlook for an improved August rate is unchanged. And, barring an auto strike, September will be the strongest month of the first three quarters of this year.

Potomac Fever—While keeping a close check on the steel market, steelmakers also have one eye on Washington. The Administration, and some in Congress, are increasingly control-minded.

As talk about price and other controls on business gets louder, control psychology is having more influence on the steel industry's price thinking. The industry is having second thoughts about the Capital's influence on prices.

What About Prices?—Previously, the industry's greatest concern was the thorough going-over by the Administration and like-minded Congressmen that would follow a general price increase. Now, the industry is also concerned over the prospect of price controls coming at a time when most believe prices are inadequate.

However, there is still no evidence that a price decision has been made, or that a general increase is in the offing.

Making Sure—On general market conditions, at least one big steel customer in the East is lining up its steel orders well into next year. This user was hurt in a previous tightening of the market when a month was "dropped" from mill schedules. Its steel needs are now lined up well into next year.

The market is not universally strong, but flat-rolled and some other products are likely to call for longer delivery dates within a month. Spot deliveries are hard to get now and are certain to go out the window. There are instances on record of embarrassed users who counted on emergency delivery but had to wait three weeks for tonnage.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	95	85	101	88
Buffalo	81	80	84	81
Pittsburgh	88	82	93	71
Youngstown	88	74	89	78
Cleveland	110	106	123	81
Detroit	120	125	134	125
Chicago	106	111	114	86
Cincinnati	112	105	118	68
St. Louis	104	80	120	64
Southern	112	105	117	95
Western	118	116	122	84
U. S. Index	99.8	95.5	106.2	83.2

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,860	1,779	48,710	63,065
Ingot Index				
(1957-59=100)	99.8	95.5	93.4	120.9
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$36.67	$36.67	$37.83	$31.17
No. 2 bundles	$24.17	$24.17	$25.17	$21.17

Keep A Sharp Eye on Scrap

Industrial scrap is an important item for purchasing agents to watch.

Its long-term outlook, as an industry, is strong. But there are many factors to consider.

▪ In many companies, the purchasing agent performs a double role. He's the buyer of raw materials for the company; he's the seller of the scrap generated by the company's manufacturing process.

F. G. Buchheit, assistant director of purchases for U. S. Steel Corp., can speak from the standpoint of the purchasing man who buys what many purchasing men sell.

He points out that industrial scrap represents about 30 pct of the 30 million tons of scrap purchased by steel mills and foundries in the U. S. each year. He says there is some concern in the scrap industry as consumption grows. Availability of prime scrap isn't measuring up to the consumption rate.

Obsolete Items—One factor: At least 70 pct of the scrap used today comes from obsolete items. Wrecked autos, wrecked railroad cars, building demolition, farm equipment and other items are sources of this material. In recent years, this material has decreased in desirability. This is largely due to the fact that more contaminating materials are found with the basic steel in scrap. Rubber, tin, and copper are chief problems.

While producing quality scrap from obsolete sources has become more difficult, the pressure on available scrap supplies has grown. Even with the weak mill demand recently, mill and foundry capacity gained in the 1950's. Electric furnaces have risen in number and these are users of high charges of obsolete scrap.

ROTH: Cost of scrap may rise.

Overseas Shipments—Exports of scrap to Europe and Japan have climbed sharply in the past two years. And a growing share of U. S. factory output uses only steel sheet which produces less recoverable scrap.

Mr. Buchheit's remarks suggest growing steel mill interest in what the mills call "prompt industrial scrap." This is scrap purchased from industries where it is a by-product of their metalforming activity.

Walter Roth, Erman-Howell Div., Luria Steel and Trading Corp., underlines the growing importance of foreign buyers in the U. S. scrap market.

A few years ago, one of the large western railroads shipped most of its scrap to Chicago, St. Louis or Kansas City. Today, reports Mr. Roth, 90 pct of its scrap moves to the West Coast for overseas shipment. The bundles produced by a Michigan auto plant once sold in Detroit or Chicago. They now go to Europe.

The Future—Mr. Roth's prediction for scrap's long-range future: Though there's been a buyers' market in scrap for the past ten years, the use of scrap will continue to increase with the steel industry. But cost of preparation will go up as freight rates and labor costs advance.

Equally, he feels, the export market represents a long-time market for U. S. produced scrap. While Mr. Roth pinpoints the fact that scrap use will grow only as prices hold proper ratios with hot metal (blast furnace iron) costs, his analysis suggests a strengthening long-range outlook.

A suggestion from Peter Young of the Atchison, Topeka, and Santa Fe Railway Co.: Don't allow stocks to pile up while you speculate on a better price. Storage and handling costs can chew up any real gains.

Not Dying—The consensus among many experts in this field is that scrap is no dying industry. But to get optimum return from the scrap sold, in-plant grading and sorting will be increasingly important factors.

And the foreign scrap picture will have a continuing effect on the course of domestic prices.

In other words, don't hold on to materials expecting to make large, short-term gains.

The present scrap market shows signs of weakness. But this is a seasonal factor, prompted by mill and foundry vacation schedules. Most scrapmen predict strength will return by fall.

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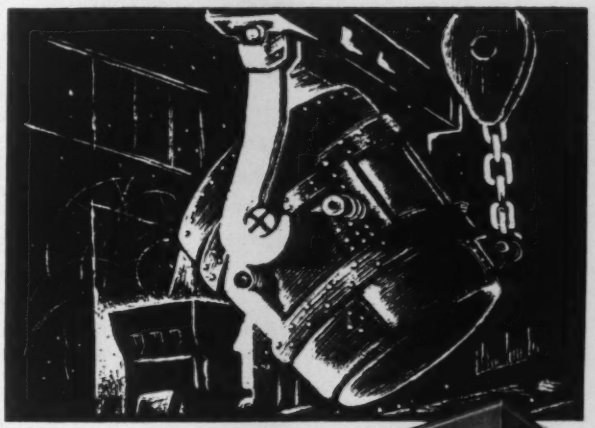

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New Stainless Boost Stirs No Response

So far, Jessop Steel's increase in some grades of chrome-bearing stainless is being ignored by other mills.

Move follows pattern set earlier when Crucible raised nickel-bearing grades, other mills refused to follow suit, and the increase was withdrawn.

■ Another stainless price increase, an advance in some chrome-bearing grades by Jessop Steel Co., is being ignored by other producers.

Jessop advanced base prices on some stainless products in Types 403, 410, 501, and 502 effective July 13. Thus far other mills have not announced similar increases.

This is the same pattern followed in earlier boosts of some nickel-bearing stainless grades by Crucible Steel Co. Other mills refused to follow suit and after about two weeks Crucible withdrew the increase.

Costs Blamed — The Jessop increases, ranging from 5 to 7 pct, are for products made at the company's plant at Washington, Pa. and in its operating subsidiary, Green River Steel Corp., Owensboro, Ky.

In announcing the changes, Frank B. Rackley, president of Jessop, indicated prices of other stainless grades may also be increased in the near future.

He blamed rising costs for the boosts and said studies were underway to decide whether price increases are warranted on other stainless grades.

Economic Necessity—Mr. Rackley noted also: "We operated profitably the first six months and our order books indicate we will operate profitably the remainder of the year. But increases in raw materials and manufacturing costs are catching up with us. It has become an economic necessity to raise prices."

USS Eliminates Discount—In another price move, the National Tube Div. of U. S. Steel Corp., effective July 13, discontinued the 4 pct discount being allowed distributors on shipments of oil country casing and tubing into warehouse stocks. At the same time USS reduced its mill prices for these products by 4 pct at both producing points and down river barge terminals.

Competition Underscored—The discount had been intended to encourage increased warehousing of oil country goods by distributors, the Corp. noted. But the "additional discount reflected itself in lower consumer prices in the oil country casing and tubing market."

Both the changes in oil country seamless and in stainless highlight the continued competitive market conditions.

Sheet and Strip—Many mills expect September to be the peak month of the year for sheet shipments. Right now, July shipments are below those of June, in some cases up to 20 pct. But mills feel an August upturn of 10 to 15 pct is certain.

July ordering at **East Coast** mills was slow. But buyers who blanked out July are coming in for August and September tonnage. Inventory building by service centers and users in the **Midwest** is mainly limited to cold-rolled sheet and galvanized. Mills there are optimistic about August-September sheet operations.

Tinplate — Canmakers are apparently applying tight inventory controls. As a result, mills are not certain how the shipping pattern will develop. One producer looks for a heavy flow of shipments in the current quarter, followed by a sharp decline in late September. Another feels shipments will be spread more evenly across the year, avoiding the large buildups of the first half of '61. Right now shipments are running at a subnormal level after a disappointing second quarter.

Over the first five months of the year shipments of metal cans were up 48,000 tons from 1960. But shipments of tinplate are down by 174,000 tons. The growing use of thin tinplate could be a factor. However, thin tin accounted for less than 5 pct of tin mill shipments in first half '61.

Bar—In a statement to The IRON AGE F. J. Robbins, president, Bliss & Laughlin, Inc., declared, "I don't believe there will be any increase in the price of cold-finished bars this year, unless there's a very considerable change in marketing conditions."

Right now cold-finishers are having a slow July, but counting on a fast comeback in August. Sales gains possibly as high as 25-30 pct are predicted.

Pipe and Tubing — Pipe shipments by mills are down slightly from June levels. Standard pipe and conduit have moved up for one **Pittsburgh** mill. However linepipe is lagging and oil country seamless is off about 5 pct from a good June.

PURCHASING AGENT'S CHECKLIST

Westinghouse new order processing system streamlines flow, speeds shipments. P. 65

Economic factors are limiting influence in fixed-program automation systems. P. 79

Eight reasons for short bearing life center on abuse. Here's how to avoid failures. P. 89

COMPARISON OF PRICES

(Effective July 17, 1961)

Steel prices on this page are the averages of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	July 17 1961	July 10 1961	June 12 1961	July 12 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.60
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes.	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	July 17 1961	July 10 1961	July 12 1961	July 12 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$35.50	$36.50	$30.50
No. 1 steel, Phila. area	38.50	38.50	39.50	33.50
No. 1 steel, Chicago	36.00	36.00	37.50	29.50
No. 1 bundles, Detroit	35.50	35.50	35.50	27.50
Low phos., Youngstown	40.50	40.50	40.50	33.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	48.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	49.50
No. 1 mach'y cast, Chicago	49.50*	48.50	49.50	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$36.67	$36.67	$37.83	$31.17
No. 2 bundles	24.17	24.17	25.17	21.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.00	31.00	31.00	33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	116.25†	117.125	113.00	102.625
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electroyltic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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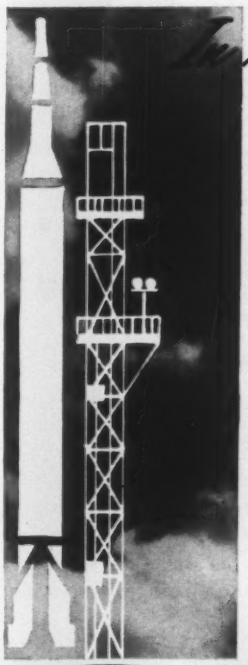
*Appears in the July 13-July 27 issues.



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Prices Are Still Marking Time

Because of the summer lull and lack of immediate export interest, scrap prices are marking time.

Brokers and dealers still look for a fall upswing.

■ It's the same story for the scrap market this week: Very little activity because of the summer vacation schedules and reduced export interest.

However, the market isn't any weaker. If anything, it's unchanged. Most scrapmen refer to the present market situation as just "marking time." They seem to feel August and September will bring a noticeable upswing.

Stable prices are reported from almost all the key areas this week. Fresh support was given to the Chicago market with some additional broker buying. Prices on the recent railroad list in Pittsburgh reflect very little change.

Even in Philadelphia where some dealers are referring to this as "the worst summer in many years," prices are unchanged.

It all boils down to a case of seasonal snags. There's a good chance that any upswing that does materialize for the final period could cause prices to climb to a new high for the year. Some scrap experts are now predicting higher prices in the near future (see p. 132).

Because of the lull, The IRON AGE composite price for No. 1 heavy melting is unchanged this week at $36.67. The composite price for No. 2 bundles is still $24.17.

Pittsburgh—The market continues quiet and relatively stable. Prices of railroad grades showed little change on recent lists. No. 1 railroad heavy melting was off about $1 on a late list. Railroad specialties were up. The downward move was attributed to an easing of export demand rather than any change in the local market. Dealers are being quoted $23 on local shipments of No. 2 bundles.

Chicago—The market appears to be holding firm with some additional broker buying offering fresh support as brokers moved to fill orders on which they were still short. Mill activity continues at a low level. Early indications suggest reasonable gains in the amount of scrap to be offered on August lists. Efforts to buy No. 1 heavy melting at less than $35 from the dealer and broker efforts to purchase No. 1 dealer bundles at $36 met with little success. Broker buying of No. 1 dealer bundles at $37 brought in scrap, however.

Philadelphia — Some dealers say this is the "slowest summer in years." The market in this area is static. There is very little domestic interest and limited exporting. But most scrapmen still say it's a seasonal slump in the market and the end of the vacation schedules should definitely bring an upswing.

New York — Export demand seems to be easing slightly. But this is the vacation period, so it's not affecting the market. Dealers say they are keeping busy. They expect no change until August, at best.

Detroit—Market is quiet. There are homes for odds and ends that come up. Prices are steady. No change is expected on August's industrial list. Not too much scrap will be offered. The buildup in tonnage will come in September when auto plants swing into action.

Cleveland — Railroad lists held their own in this area indicating the market is still on a plateau. Only small tonnages are moving to mills in special lots and dealers don't have any bulging inventories.

Cincinnati—A slow August is in prospect in the area because of only fair demand and the continued high ratio of pig iron being used. Dealers will sell only small amounts at prevailing prices. An unusual market for blast furnace grades appeared recently from a shift in grades of ore being used.

St. Louis — The scrap market firmed somewhat this week. One mill that has been almost completely out of the market recently made some substantial purchases.

Birmingham — One Birmingham cast iron pipe manufacturer returned to the market this week with purchases at unchanged prices. Otherwise there was very little activity. Dealers are still busy delivering first of the month orders.

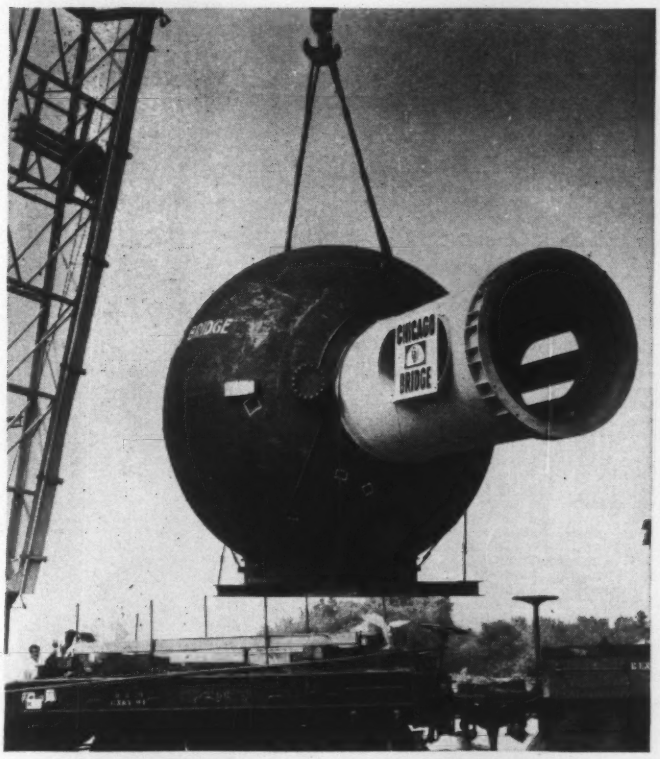
Buffalo — Market is quiet with dealers not looking for any change through July. However, orders appear to be shaping up for August and September. Scrapmen report there's no need to soften prices.

Boston—This is still an extremely quiet market with very little, if any, domestic or export interest.

West Coast—Prices are holding their own. Mills are marking time waiting to get the vacations out of the way. Exporting has slowed down a little.

Houston — The market is still slow. There has been no real change since the district mill came into the market for limited tonnage some time ago.

HUSKY to handle Petroleum Molecules



Hortonclad spherical reactor for a petroleum catalytic reforming unit.

Welded Hortonclad spherical reactor for oil company catalytic reforming unit works under very high pressures. Chicago Bridge and Iron Company uses radiography to prove every seam sound.

STURDY STUFF, this husky refinery unit. Seventeen feet in diameter, made of 3.65-inch-thick Hortonclad plate composed of ¼-inch 405 stainless steel on carbon steel. Seams between segments and end covers are welded—then radiographed to check for complete, continuous fusion.

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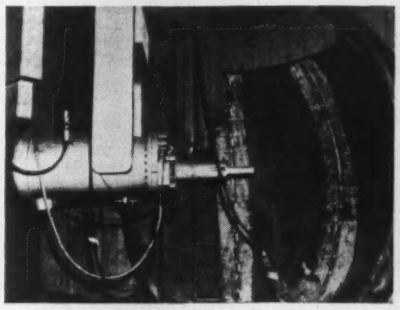
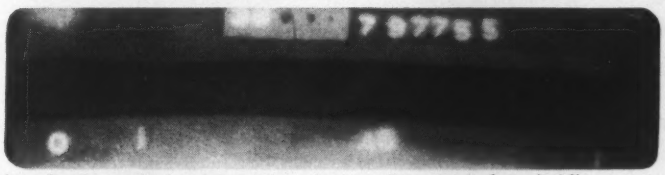


2-million-volt x-ray unit set to radiograph intermediate seams.

Roundabout seam is radiographed with 50-curie pill of Cobalt 60.



Radiograph showing mild steel seam of reactor before cladding.

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SCRAP PRICES *(Effective July 17, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR specialties	45.00 to 46.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	110.00 to 115.00
430 bundles and solids.	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$35.00 to $37.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.50 to 37.50
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	44.00 to 45.00
Low phos. punch'gs plate, ¼ in. and heavier	44.00 to 45.00
Low phos. 2 ft and under	41.00 to 42.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	46.00 to 47.00
Rerolling rails	58.00 to 60.00
Rails 2 ft and under	48.00 to 49.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	58.00 to 59.00
RR couplers and knuckles	43.00 to 44.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	42.00 to 43.00
Cast iron wheels	34.00 to 35.00
Malleable	46.00 to 47.00
Stove plate	36.00 to 38.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	90.00 to 95.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	43.00 to 44.00
Heavy turnings	27.00 to 28.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.50 to 41.50
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	39.00 to 40.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	34.50 to 35.50
No. 1 factory bundles	41.50 to 42.50
No. 2 bundles	22.50 to 23.50
No. 1 busheling	34.50 to 35.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	39.50 to 40.50
Low phos. punch'gs plate	35.50 to 36.50
Drop forge flashings	34.50 to 35.50
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	39.00 to 40.00
Malleable	51.00 to 52.00
Stainless	
18-8 bundles	170.00 to 175.00
18-8 turnings	100.00 to 105.00
430 bundles	70.00 to 75.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed. bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. meltings	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
RR specialties	40.00 to 41.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	55.00 to 56.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	43.50 to 44.50
Structural and plate, 2 ft.	42.50 to 43.50
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rail, random lgth.	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	32.00 to 33.00
Drop forge flashings	32.00 to 33.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	30.00 to 31.00
Automotive cast.	39.00 to 40.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	8.00 to 8.50
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	29.00 to 29.50

San Francisco

No. 1 hvy. melting	$41.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	$16.00 to 17.00
Cast iron borings	16.00 to 17.00
No. 1 cupola cast.	45.00 to 46.00

Los Angeles

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	50.00
No. 1 cupola cast.	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	$25.00 to 26.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

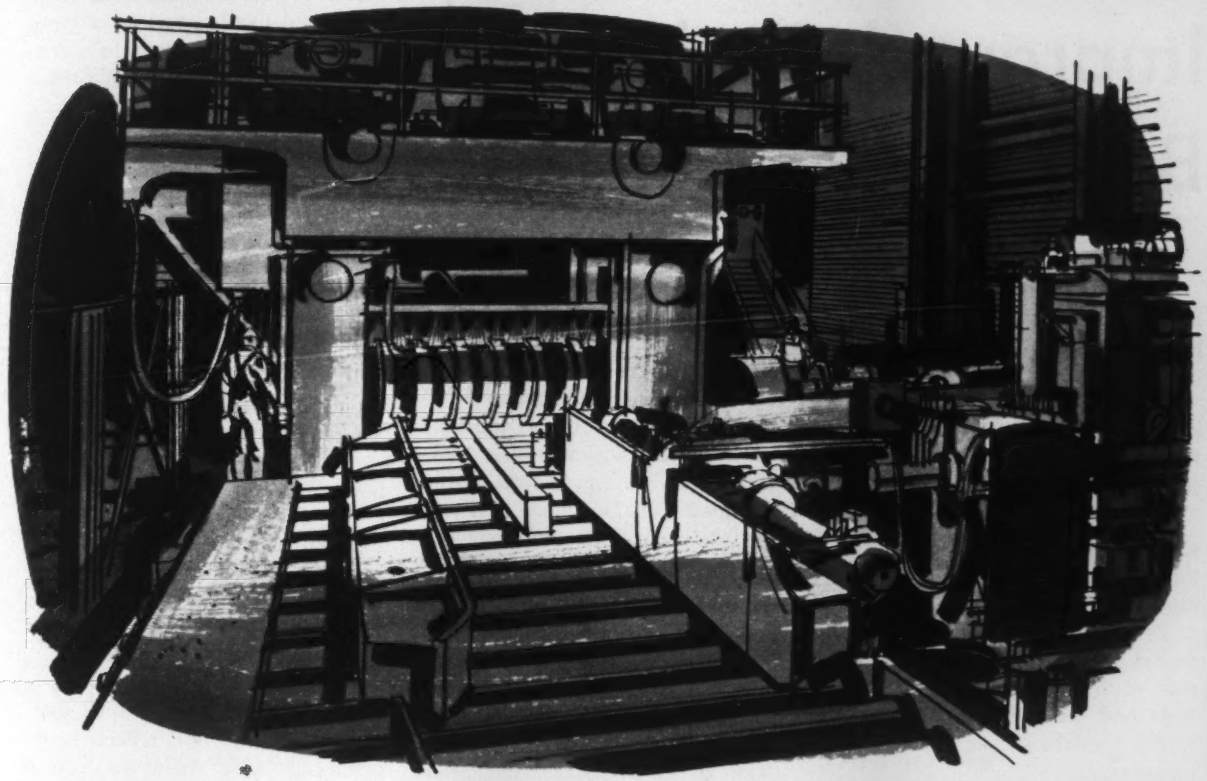
No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Bush., new fact., prep'd.	31.00
Bush., new fact., unprep'd.	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	22.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	29.00 to 30.00

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



SULPHUR . . . FRIEND OR FOE?

Sulphur is an element of several faces. As a sulphuric acid compound it occupies an important place in the steel industry where it is used for cleaning metal, the recovery of ammonia products from gas and in making chemical analyses.

As an element in the composition of steel, however, sulphur is welcome only for the free machining properties it brings to certain grades. A small percentage can more than double the speed and ease with which steel bars can be machined into gears, screws, bolts, and other small parts. There is even a free machining type of stainless steel. In these instances, sulphur serves the steel industry as a friend.

But, sulphur can be an enemy as well when it appears in the steelmaking furnace as an unknown residual element.

Sulphur makes steel hot short, meaning that it cracks and tears in rolling or forging processes. It can ruin a heat of stainless steel when its presence is unknown. Therefore, scrap, high in sulphur content, unless it is properly segregated, must be considered a foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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Improved Outlook Buoys Brass Mills

July is the traditional slump month for the U. S. brass mill industry, but not this year.

Executives report unusual improvements. And all are looking forward to a real surge, starting in August or September.

▪ There are some real signs of optimism in the U. S. brass mill industry.

This is significant because producers were very pessimistic at the start of the year when business was bad. And they were unsure in the spring when the copper price started to gyrate.

Seasonal Slump—July is the traditional vacation month for brass mills and their customers. It has long been one of the worst sales and shipments months of the year.

But the head of one major mill is "pleasantly surprised" at the small amount business has fallen this month. Another points out that his July business is considerably better than July 1960. And a third says he feels "quite good" about current conditions.

Looking Ahead—Underlying the optimism—in an industry where optimism has not been common in the last five years—is what mill executives believe is coming in August, and particularly in September and October.

One brass mill president reports that it is usual on the first of a month to have few orders for the following month. But on the first of July he had enough August orders to keep his mills busy for about one week.

Not General—Some mills haven't had a spurt quite as emphatic. Many expect to. And almost all are looking for best business of the year, starting in September.

Adding fuel to this optimism: Two key markets, automotive and construction, haven't added their full impact yet. No major mill reports any substantial auto buying. But they expect it.

Auto Outlook—Mill heads have been following auto developments carefully. They generally feel that: 1. There won't be an auto strike; and, 2. new models will be well accepted.

One major automaker has been reported to have bought a large tonnage of foreign strip for radiators. But foreign competition has eased off and is not rated a major market factor.

Tempering Factors—Mills admit that part of the August boost in orders may be for metal deferred from July. And they also say that if 1962 cars don't go over, 1961 is going to turn out to be a miserable year.

On the other hand, if '62 cars are well received, October and November brass deliveries will definitely boom. They will also stretch out from the current few days.

Building Pace — Some mills are also anxious about residential construction. They say President Kennedy's new program will definitely stimulate building starts. And they expect to feel the effects of this as early as October.

Customer inventories are still the unknown quantity in the brass market. Most mills believe they are low. But producers feel it will take heavy stimulation to get any extensive rebuilding.

One executive figures that if auto and/or construction sales start stretching deliveries, this will stimulate inventory rebuilding in other markets. This could push 1961 brass business well above last year, despite the bad first quarter.

Copper

June was a good month for the U. S. copper industry, according to the latest figures from the Copper Institute.

Refined production was down slightly to 141,140 tons, from 148,961 tons in May. But deliveries to fabricators soared to 139,700 tons, from 131,847 tons the previous month.

Outside the U. S., both production and deliveries were off. Production dropped to 166,319 tons, from 169,550 tons in May. Shipments were 197,847 tons, compared with 208,516 tons in May.

The industry is not particularly surprised at the drop in June shipments. Dealers say it reflects hedge buying in May when the copper price was gyrating.

Tin Prices for the Week

July 11—116.875; July 12—116.50; July 13—116.50; July 14—116.25; July 17—116.25*.

* Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	5/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 141.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/8
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Red	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $6.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismouth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .. $ 1.31
Cobalt, 97-99% (per lb) .. $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas. per troy oz. $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. .... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $195 to $199
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz. . $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 420 ..... 30.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 23.75-24.25
- 0.60 copper max. 23.50-24.00

Piston alloys (No. 132 type).. 25.00-26.00
No. 12 alum. (No. 2 grade) ... 21.75-22.25
108 alloy 22.25-22.75
195 alloy 24.75-25.75
13 alloy (0.60 copper max.) ... 23.50-24.00
AXS-679 (1 pct zinc) 22.00-23.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 23.25-24.25
Grade 2—92-95% 22.00-23.00
Grade 3—90-92% 21.00-22.00
Grade 4—85-90% 20.00-21.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28
- No. 2 copper wire 26¼
- Light copper 24
- *Refining brass 25
- Copper bearing material 24

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28
- No. 2 copper wire 26¼
- Light copper 24
- No. 1 composition 23
- No. 1 comp. turnings 22½
- Hvy yellow brass solids 18
- Brass pipe 16½
- Radiators 19

Aluminum

- Mixed old cast. ..... 12½—13
- Mixed new clips ..... 14½—15
- Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 24¼—24¾
- No. 2 copper wire ..... 22¼—22¾
- Light copper ..... 20 —20½
- Auto radiators (unsweated). 16 —16½
- No. 1 composition ..... 20½—21
- No. 1 composition turnings.. 20 —20½
- Cocks and faucets ..... 16½—17
- Clean heavy yellow brass ... 14¼—14¾
- Brass pipe ..... 16½—17
- New soft brass clippings .... 18½—19
- No. 1 brass rod turnings .... 16½—17

Aluminum

- Alum. pistons and struts .... 7 — 7½
- Aluminum crankcase ..... 9½—10
- 1100 (2s) aluminum clippings 12¼—12¾
- Old sheet and utensils ..... 9½—10
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 10 —10½
- 2020 (24s) clippings ..... 11 —11½

Zinc

- New zinc clippings ..... 5 — 5¼
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel

- Pure nickel clippings ..... 56 —58
- Clean nickel turnings 43
- Nickel anodes ..... 56 —58
- Nickel rod ends ..... 56 —58
- New Monel clippings ..... 26 —26½
- Clean Monel turnings ..... 18½—19
- Old sheet Monel ..... 25 —25½
- Nickel silver clippings, mixed. 20
- Nickel silver turnings, mixed. 17

Lead

- Soft scrap lead ..... 7¼— 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 90 —92
- No. 1 pewter ..... 65 —67
- Auto babbitt ..... 46 —47
- Mixed common babbitt ..... 10 —10½
- Solder joints ..... 15 —15½
- Small foundry type ..... 9 — 9½
- Monotype ..... 9¼— 9¾
- Lino. and stereotype ..... 8½— 8¾
- Electrotype ..... 8 — 8¼
- Hand picked type shells .... 5¾— 6¼
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2½— 3

(Effective July 17, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective July 17, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke▲ *1.25*-lb. base box	Electro▲▲ *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ▲ COKES: 1.50-lb. add 25¢. ▲▲ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective July 17, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*		7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective July 17, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	7.91	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective July 17, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller — 25,000 pcs	50	
5/16, ⅜ & ½ in. diam — 15,000 pcs	50	

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller — 25,000 pcs	56	60
5/16 or ⅜ in. diam — 15,000 pcs	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective July 17, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	....	212	193	9.00	9.55
Aliquippa *J3***	173	190	....	....	190	9.00	9.675
Atlanta *A8***	173	191	....	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	....	....	....	....	....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	....	....	....	....	....	9.00	9.55
Chicago *W7*	173	....	....	....	....	9.00	9.55†
Cleveland *A6*	....	....	....	....	....	....	.....
Cleveland *A5*	....	....	....	....	....	9.00	.....
Crawf'dav. *M4***	175	192	....	214	198	9.10	9.80
Donora Pa. *A5*	173	187	....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	....	212	193	9.00	9.55
Galveston *D4*	9.10‡	....	....	....	....	....	.....
Houston *S2**	178	192	....	217	198	9.25	9.80†
Jacksonville *M4*	175	192	....	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet Ill. *A5*	173	187	....	212	193	9.00	9.55
Kokomo *C9**	175	189	....	214	195*	9.10	9.65*
L. Angeles *B2****	....	....	....	....	....	9.95	10.625
Kansas City *S2**	178	192	....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	....	....	....	....	....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	....	....	213	9.95	10.50
Rankin Pa. *A5*	173	187	....	....	193	9.00	9.55
So. Chicago *R3*	173	187	....	....	193	8.65	9.20
S. San Fran. *C6*	....	....	....	236	....	9.95	10.50
Sparrows Pt. *B3***	175	....	....	215	198	9.10	9.775
Struthers, O. *Y1**	....	....	....	....	....	8.65	9.20
Worcester *A5*	179	....	....	....	....	9.30	9.85
Williamsport *S5*	....	....	....	....	....	....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec., 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

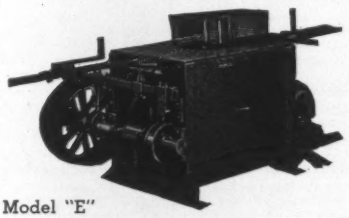
COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

KARDONG STIRRUP BENDER

For Concrete Reinforcing Bars

This bender is the result of our 30 years' experience in the manufacture of reinforcing bar benders. One man can easily bend 300 four bend stirrups an hour. This bender is also a very practical bender for light slab bars and miscellaneous bending. Write for catalog of our complete line of reinforcing bar benders.



Model "E"

KARDONG BROTHERS, INC.

MINNEAPOLIS 13, MINN.

WHO*

In the best circles you'll find they use only . . .

Ottemiller

CAP SCREWS · SET SCREWS · MILLED STUDS

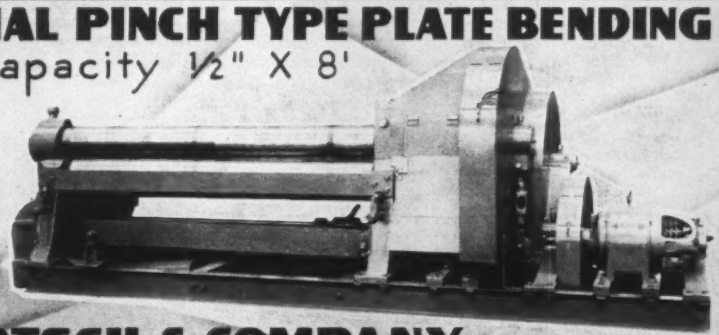
CUSTOM SCREW MACHINE SPECIALTIES

*Wm. H. Ottemiller Co.

YORK, PENNSYLVANIA

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity ½" X 8'



Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work

BERTSCH & COMPANY, CAMBRIDGE CITY · INDIANA

FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads Ton (Bulk)		Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.50	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective July 17, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

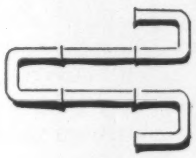
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

GOT A JOINING PROBLEM?

Having trouble with corrosion? Dissimilar or unusual metals? Successive joints on the same work? We'll tackle it . . . at no cost to you.

Tough joining problems gave this company its start. Every time we solved a problem we had a new customer . . . and often a new product to sell! That's how we got into the special alloys business in 1946. That's how we grew.

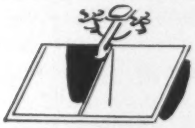
FOR EXAMPLE



Automobile air conditioning units called for a low-cost but highly corrosion resistant heat exchanger with freon-tight seals in aluminum tubing. ALL-STATE developed a cadmium-zinc alloy that was low in cost, resistant to all atmospheric conditions, and leak-proof. Same alloy now used for repair of automobile radiators.

Our 430° non-acid flux was developed for joining stainless with minimum hazard to users. A subsequently discovered application was joining Hydro T-metal without discoloration.

It took months to figure out how to braze the cathode wire to the terminal inside radio vacuum tubes without blackening the inside of the tube. Our silver-copper-indium alloy lowered brazing temperature without increasing vaporization rate, solved the problem.



Stainless steel kitchen sinks became economically feasible only after we helped a manufacturer solve the problem of a perfect color match with a monel gas welding rod.

We still like tough joining problems. That's why we invite you to put your joining problem up to us. We may fail or succeed, but we'll work on it with the best research brains and equipment, and it won't cost you a penny.

Write and tell us what your joining problem is, with the essential details.

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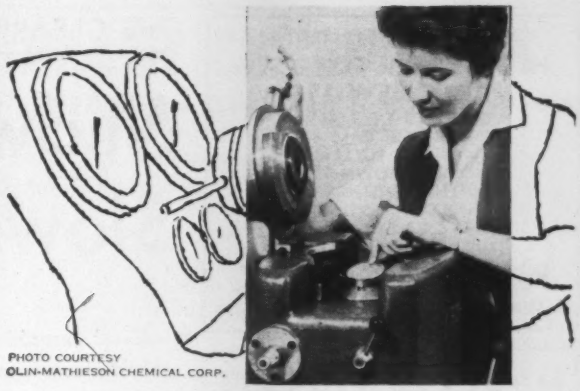

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NEW Testing Method Gives Critical Formability Data

Reproduce deep drawing stresses with the new Tinius Olsen Ductomatic, and make critical, accurate formability predictions for any sheet metal. Reject defective material before it is formed. Define drawing limit or effects of multiple drawing operations. Study Earing characteristics. Reduce or eliminate trimming and other rework. Get the facts. Write for Bulletin 62. Tinius Olsen Testing Machine Company.

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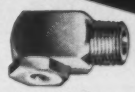

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ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

3000/4500 TON BLH HIGH SPEED FORGING PRESS NEW 1954
DIAMETER OF RAM 62"
STROKE OF RAM 40"
2—17" DIA PULLBACKS
MOVING DOWN TYPE
WITH INTENSIFIER
SN. S.O.520500-1-2-3
WT. 620,000#
FRACTION OF ORIGINAL COST
POLLOCK INDUSTRIES INC.
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at 201 Rover St., Everett, Mass.
500 TON/DAY BLAST FURNACE
108 KOPPERS COKE OVENS
2 PUSHER MACHINES

OVERHEAD CRANES 230V. D.C.
110 Ton Cleveland Ladle 48'5" Span
20 Ton Shaw 41'7" Span, Cab Oper.
10 Ton Shaw 52' Span, Cab Oper.
10 Ton Bedford ¾ Yd. Bucket 61' Span

230V. D.C. MOTORS

HP	Type	Speed	Winding
150/200	MDS418AE2	400/730	Series
75	MD414AE	274/475	Series
45	MD410AE	172/550	Comp.
35/45	MD410AE	132/525	Series
33	MD408AE	126/625	Comp.
15/19	MD406AE	59/650	Series
5	MD403AE	21/700	Comp.
3	C01822	875	Series

ELECTRIC BRIDGE 230V. D.C.
Traveling on Rail, 230' Span, plus 80' Cantilever, 6 Ton Bucket, Single Trolley, Motor Driven

CARS
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50 Ton Slag Std. Ga. w/300 Cu. Ft. Ladles (2)
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Penna. HAMMERMILLS SX13 400 HP (3)
Koppers 2 Roll CRUSHER 36"x42" 40 HP
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Midwest Activity Slows Down

Used machinery dealers in the Chicago area say business is in a lull just now.

But gains are expected in September as industries begin to spend for the final quarter.

■ When the expected June gains failed to materialize, Midwest used machinery dealers braced for a long and dry summer. The firming in late May, which led many dealers to begin strengthening their inventory position, seems to have again fallen back.

Those rebuilding shops which gain slightly in activity during July and August plant shutdowns indicate they are no more than holding even this July.

One factor that may have taken the steam from the June-July market picture: A considerable number of relatively late model tools appeared on the market in second quarter. They were absorbed but not at expected price levels.

Price Softness—In one case, a 1957 heavy tool moved at one-third original cost. Other sales suggest a softness in pricing that persisted through June despite the mild sales gain that was noticeable at the beginning of that month.

Used tool men are quick to point out that sales are still being made. Reconditioned and "as is" tools continue to move into customer hands. But customers are shopping. Inquiries are remaining high in relation to sales.

Observers are now indicating that it seems very possible that this trend will continue to hold until mid-September. This is despite the fact that other "indicator" industries, which have customarily moved with the machine tool industry, have already shown very sharp gains and indicate that these gains will continue through the third quarter.

Reasons — Tool sellers suggest that management continue to keep a tight rein on capital expenditures by its purchasing department. Also, buyers are waiting for depreciation reforms before making fresh purchases. The latter isn't given too much weight, even though mentioned frequently.

Tool room equipment continues to lag in the Midwest. Rebuilding is holding, but is showing no seasonal gains. Heavy production equipment, while not showing any marked gains, is doing relatively better than other tool classes.

Sheet fabricating equipment, which is often carried up in second quarter by seasonal influences, continues to hold well. This reflects the strong hold in Midwest sheet consumption during recent years.

Good Market—For the buyer, the current used machine tool market offers excellent prices, and considerable selection of good and late model tool equipment. With a firmness now expected by September, some surprise is expressed at his failure to take advantage of the economies offered right now.

Despite the fact that some major Midwest industries are planning for a strong fall production schedule, buyers are hiding. Monthly production increases of 24 pct aren't uncommon in third quarter industrial forecasts by individual manufacturers.

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14' BETTS, 152" Table, 124" Height Under Rail, 172" Max Swing, M.D.
12' BETTS, 120" Table, 80" Height Under Rail, 146" Max Swing, M.D.
12' CINCINNATI, 144" Table, 72" Height Under Rail, 150" Max Swing, M.D.
10' CINCINNATI, 120" Table, 72" Height Under Rail, 122" Max. Swing, M.D.

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This 700,000 sq. ft. plant is being divided up into parcels to suit the requirements of smaller operations, varying from 5,000 to 500,000 sq. ft. As a result of the subdividing, there will probably be both buildings and cranes for dismantlement. For information on the Real Estate only write Arthur F. Texter and Associates, Realtors, 720 Wood St., Pittsburgh 21, Penna.; for the equipment or buildings and cranes for dismantlement, write to Hetz.

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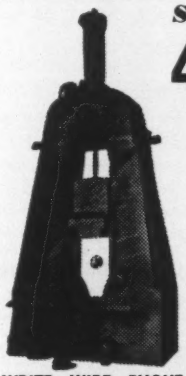

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20—8" Dia. x 4"/6"/8" Face 2-Hi Cold Mills with 25 H.P. Motors 230 v. DC. Edge Rollers, Coilers, etc.—complete

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10—50 KW to 200 KW TOCCO Units
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20 KW ECCO Induction Heater
15 KW GIRDLER Dielectric Heater
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30 KW VACUUM Melting, Complete—Like New
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36x32 WHEELABRATOR w/loader *available*
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48x72 WHEELABRATOR w/loader
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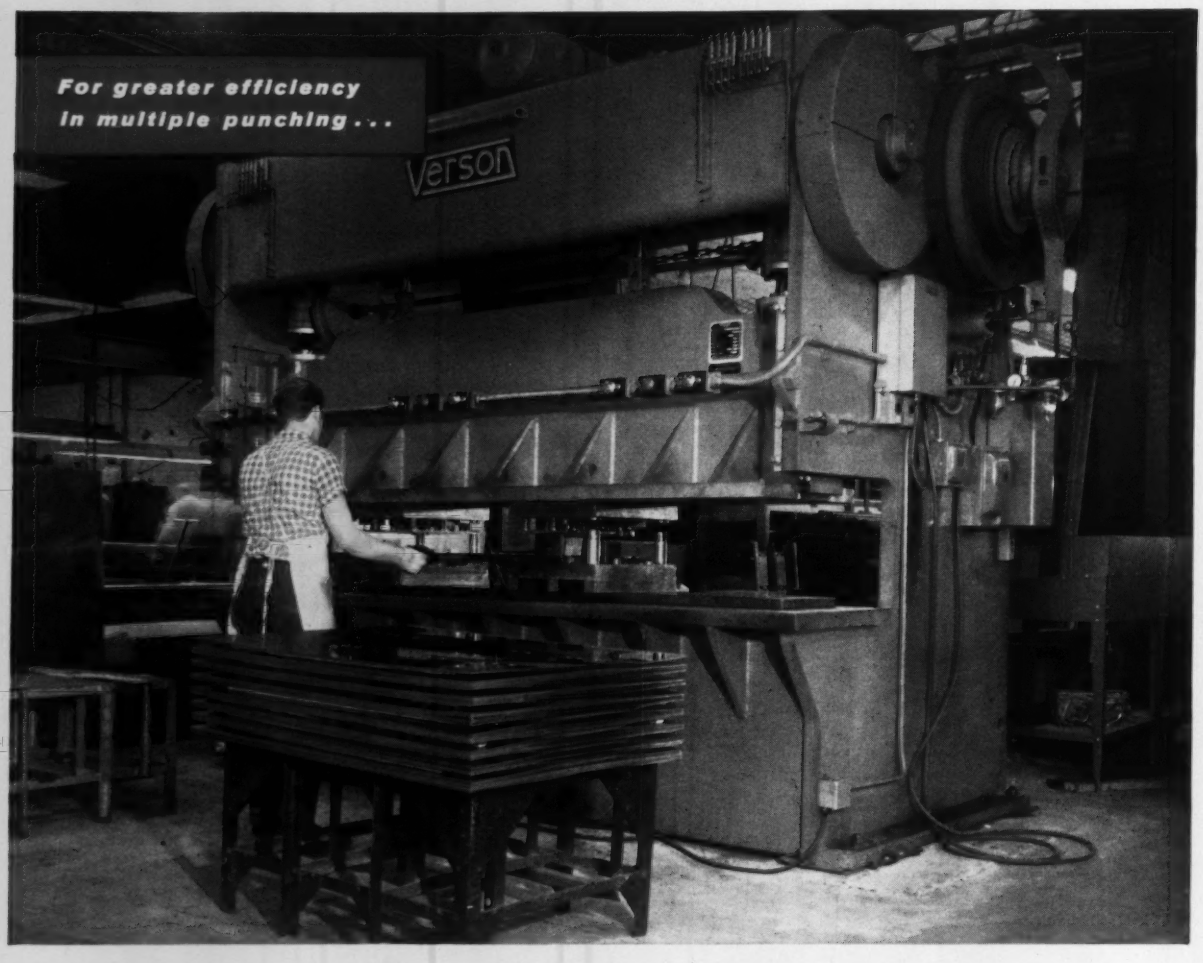

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